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REPORTING SYSTEM ADJUSTMENT FOR THE PURPOSE OF MEASURING THE EFFICIENCY OF PUBLIC HEALTH SERVICES

PRILAGODBA SUSTAVA IZVJEŠTAVANJA ZA POTREBE MJERENJA EFIKASNOSTI JAVNOZDRAVSTVENIH USLUGA

ABSTRACT

Disease prevention, preservation and improvement of health are the fundamental activities of the public health system and health quality determinants at national level. Thereby, strive is to maximize the efficiency and effectiveness of certain activities which implies a developed reporting system as a prerequisite for measuring achieved results. The public health system in the Republic of Croatia is organized through health and public health institutes at county level. Their activities are aimed at improving the health of the population. The purpose of this paper is to investigate the current reporting and efficiency measurement system and to suggest improvements that will enable the implementation and integration of strategic thinking of organizational units within the public health system. The use of contemporary methods and strategic management tools requires a comprehensive and unified system that ensures information base for monitoring the efficiency of results and the effectiveness of set goals. Accordingly, the objectives of the research are to identify the features of the existing reporting system on the efficiencyand effectiveness of public health services and related organizational structure on a sample of four regional public health institutes and the national institute, whichrepresent the majority of public health services in the Republic of Croatia. The analysis was conducted based on a survey, interviews and available official data for six common organizational units. The major results show discrepancy incertain forms of reporting between the institutes and the inconsistency of organizational solutions for the implementation of particular programs and activities, with an emphasis on internal recording, analysis and reporting. The contribution of this paper is in the critical analysis and the proposed reporting system model as a basis for measuring the efficiency using modern strategic tools, for the purpose of evaluating and developing health care programs, health standards and promoting overall population health.

Key words: *public health services, reporting system, strategic thinking, efficiency.*

SAŽETAK

Prevencija bolesti, očuvanje i unapređenje zdravlja temeljne su aktivnosti javnozdravstvenog sustava i odrednice kvalitete zdravstva na nacionalnoj razini. Pri tome se teži što većoj efikasnosti i efektivnosti pojedinih aktivnosti što podrazumijeva razvijen sustav izvještavanja kao preduvjet mjerenja dostignutih rezultata. Javnozdravstveni sustav u Republici Hrvatskoj organiziran je kroz zdravstvene ustanove i zavode za javno zdravstvo na županijskoj razini čije aktivnosti su usmjerene naunapređenjezdravljastanovništva. Svrha ovog rada je istražiti dosadašnji sustav izvještavanja i mjerenja efikasnosti te predložiti poboljšanja koja će omogućiti implementaciju i integraciju strateškog promišljanja organizacijskih jedinica unutar sustava javnog zdravstva. Korištenje suvremenih metoda i alata strateškog upravljanja zahtjeva sveobuhvatni i unificirani sustav osiguranja informacijske osnovice za praćenje efikasnosti rezultata i efektivnosti postavljenih ciljeva. Sukladno tome ciljevi istraživanja su utvrditi obilježja postojećeg sustava izvještavanja o učinkovitosti javnozdravstvenih usluga iorganizacijske strukture na uzorku četiri regionalna zavoda za javno zdravstvo i nacionalnog zavoda, koji predstavljaju glavninu javnozdravstvenih usluga Republike Hrvatske. Analiza je provedena na osnovi anketnog upitnika, intervjua te dostupnih službenih podataka za šest zajedničkih organizacijskih jedinica. Utvrđena je neusklađenost pojedinačnih oblika izvještavanja između pojedinih zavoda, neujednačenost organizacijskih rješenja za provedbu pojedinih programa i aktivnosti, s naglaskom na interno evidentiranje, analizu i izvještavanje. Doprinos ovog rada je u kritičkoj analizi i predloženom modelu sustava izvještavanja kao osnove za mjerenje efikasnosti primjenom suvremenih strateških alata, a u svrhu ocjene i izrade programa zdravstvene zaštite, zdravstvenih standarda i promicanja zdravlja ukupnog stanovništva.

Ključne riječi: *javnozdravstvene usluge, sustav izvještavanja, strateško promišljanje, efikasnost.*

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1. Introduction

Disease prevention, preservation and improvement of health are the fundamental activities of the public health system and health quality determinants at national level. Therefore, quality of data and adequate reporting are crucial for identifying areas in need of improvement, monitoring progress and providing different stakeholder (Smith et. al, 2009) with comparative information about health system performance. Because of the society role that public health systems have and their method of financing it is important to measure their efficiency and effectiveness (Vitezić et al., 2016). Although, data collection, their analysis and reporting are part of public health policy in many countries it is well known that healthcare professionals and policy makers can make only good decisions regarding the quality and availability of the data they use in the decision-making process.Even countries with advanced data systems have difficulty linking practice performance to outcomes due to limitations in data availability and poor capabilities in linking data (Braithwaite et al., 2017).Therefore, a developed reporting system is a prerequisite for measuring achieved results through implementation and integration of strategic thinking of organizational units within the public health system. Only carefully co-oriented national performance measurement and reporting systems can assure avoidance of data duplication, non-transparent information and dysfunctional consequences (Mannion, Davies, 2002). According to that an interoperable information system is required (Wager et al., 2009) to support the integrated reporting system. That recognized also the Ministry of Health of the Republic of Croatia and included informatization and communication

technology upgrade as one of the first priority in achieving of set goals (National Health Care Strategy, 2012-2020).
The public health system in the Republic of Croatia is organized through health and public health institutes at county level and one national institute which is the coordinator of all the regional institutes. Their primary tasks are monitoring, analysis, and evaluation of the health of the population, as well as planning, proposing, and implementing measures for the preservation and enhancement of the population's health. Namely, within a complex system such as the public health institutes of the Republic of Croatia, only accurate, timely and standardized data and a strategically oriented organizational culture can ensure quality and consistent monitoring, as well as analysis of current state of affairs in order to develop programs of health care measures, health standards and promoting health and welfare in general. Even though the 'Age of Big Data' gives new capabilities and organizational, managerial and strategic benefits (Wang et al., 2018) the Croatian health care still needs to invest a lot of effort to create a unique informatized statistic and indicator system supported by a standardized reporting system intended to measure the efficiency and effectiveness of their services.

Džakula et al. (2014) highlight the need of public and professional engagement in so far health care reforms lacked with strategic foundations and projections. They alsopoint out that 'reforms have often been riddled with scandals and controversies, undermining their efficiency' (Džakula et al., 2014, 147). Only a comprehensive and unified system that ensures information base for monitoring the efficiency of results and the effectiveness of set goals enables the use of contemporary methods and strategic management tools, like the Balanced Scorecard (BSC), that are more and more used as a strategic tool in public sector including health (Yee-Ching, 2004, Greatbanks,Tapp, 2007, Edward et al., 2011).

Therefore, this paper analysis the current reporting and efficiency measurement system of four Croatian regional institutes in association with the national institute, and suggests improvements that will prevent the duplication effort and that will enable the implementation and integration of strategic thinking of organizational units within the public health system. Additionally, for the purpose of evaluating and developing health care programs, health standards and promoting overall population health, the paper provides a proposal of key indicators for efficiency and effectiveness measurement of public health services in Croatia, which as such do not yet exist and which are considered as a part of application of modern strategic tools.

2. Public health and importance of measuring efficiency and effectiveness

As a commonly accepted definition of public health is considered to be one set by Sir Donald Acheson (1988), which is based on earlier definition by Winslow (1920), that describe public health as the science and art of preventing disease, prolonging life and promoting health through the organized efforts of society.Fundamental public health functions include: 1)surveillance of population health and well- being, 2)monitoring and response to health hazards and emergencies, 3)health protection, including environmental, occupational, food safety, and others, 4)health promotion, including action to address social determinants and health inequity, 5)disease prevention, including early detection of illness. Also, public health functions are:6)ensuring governance for health and well- being, 7)ensuring a sufficient and competent public health workforce, 8)ensuring sustainable organizational structures and financing, 9)advocacy, communication and social mobilization for health, 10)advancing public health research to inform policy and practice, and these enable the fulfillment of public health activities (WHO, 2012).

It is important to note that public health is a preventive aspect of health care, not curative, and that it covers health care at the community level, not the individual..As such, it is the determinant of a developed and effective health system of a particular country, and the development of the society is

linked to the development of the public health system, i.e. the readiness of the state to provide its programs and tasks in an efficient and effective way with the purpose of protecting and improving health.Therefore, the economic evaluation of certain measures and activities of the public health system is of crucial importance, andpursuit of efficiency is one of the central preoccupations of health policymakers and managers. The notion of health sector efficiency and effectiveness are some of the most discussed dimensions of health care performance, which seek to capture the extent to which the inputs expressed financially or non-financially are used to secure valued health system goals. Efficiency becomes particularly important in the light of financial pressures and concerns over long-term financial sustainability experienced in many health systems, as decision-makers seek to ensure that available health care resources are used efficiently for proclaimed health benefits.

Also, existing literature emphasizes that measuring the efficiency of health systems is a challenging undertaking.Problems are both conceptual and technical. The current literature as the main measurement problems in the public sector generally highlights (Kattel et al., 2013): 1)the diverse nature of public sector services, the wide range of users and the difficulty in defining the goals. The set objectives and expected public sector effects do not follow the single criterion of profit making. 2)many methods for assessing economic impact are almost impossible to apply to the public sector because they require that the effects have to be monetized (e.g. intangible effects, such as improved health, quality of life, etc.).The measurement is mostly static, while the processes are dynamic. Time lags are present,linked to the effects of many policies and the performance of the public sector.Besides these difficulties, operationalization of performance measurement also requires access to appropriate data and analytic resources. Database systems must be created specifically for performance measurement, so they may be comparable to other data systems as well.

As a starting point, i.e. the precondition of measuring efficiency and effectiveness, it is certainly the establishment of an adequate reporting system.Bearing in mind the above-mentioned difficulties in measuring the results within the public sector and also public health services, it is not an easy task. The goal of health information systems is to allow all professional and lay users within and outside the health sector to use, interpret, and share information and to transform it into knowledge (Gissler et al., 2006). According to Ibrahimov et al. (2010), Gerkens and Merkur (2010) and Bryndováet al. (2009), health information systems in Europe show great intercountry differences, and that is mainly due to the different historical and cultural contexts.The provision of information on public health programs and services provides benefits for everyone interested in the functioning and progress of the public health system, from the general public to hospital managers and governmental policymakers. Reporting about public health services is a very important tool which help decision-makers decide whether certain public health programs and activities meet their goals and formulate an adequate health policy.

3. Methodology and results

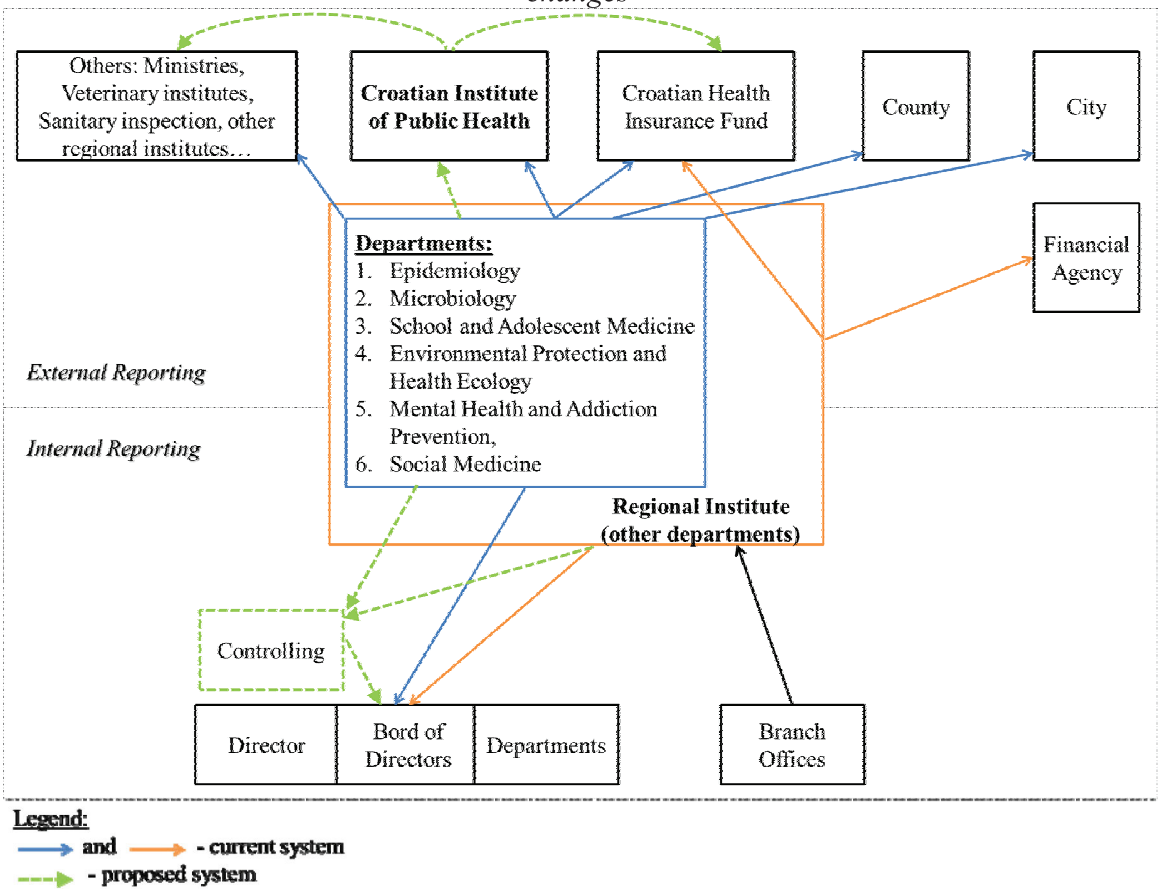
Even though the public health of Croatia is organized through 20 country-level and one national-level institutes, the basis of this study where the four regional public health institutes (Andrija Štampar Teaching Institute of Public Health, Teaching Institute of Public Health of Primorsko-Goranska County, Teaching Institute of Public Health of Split-Dalmatia County and Institute of Public Health of Osijek-Baranja County) and the one national institute (Croatian Institute of Public Health), which together represent the majority of public health services in Croatia.

The starting point of the research was a survey that was sent to all 21 institutes of public health in Croatia. The results discovered many different financial reports and statistics these institutes collect and send to the authorities and other upper-level institutes, but also the lack of efficiency and effectiveness measures. Also, there is difference in the characteristics of organizational structure manifested through different names and numbers of divisions, departments,units, etc. The second

point of research were available online official data for six common organizational units of the empirical sample (Epidemiology, Microbiology, School and Adolescent Medicine, Environmental Protection and Health Ecology, Mental Health and Addiction Prevention, Social Medicine).A detail analysis of available publications, especially statistical, showed lack of individual regional reports, their promptness, transparency, and inconsistency and disparity in comparison with national publications. This can be attributed to numerous facts caused by absence of systematic and strategic management, but in general tree factors can be highlighted: lack of control, information integrity and transparency (Pristaš et al., 2017). Additionally, what is important to emphasize, and what is at the same time one of the main characteristics of Croatian Patient Registries (Pestić et al., 2017) is the nonexistence of key information as a basis for measuring the efficiency of public health services and making decisions about overall population health. It seems that large amount of data is routinely collected and in part reported but the question that arises is: Is this the right way and concept of collecting data, and what is their use inside the health reporting, evaluating and developing system?

Therefore, interviews were conducted with the deputy directors, head of controlling or quality department of four regional, and the head of medical informatics of the national institute. The first problem that occurred in all regional and the national institute is nonexistence of organizational mapped flow report processes as part of internal control systems. Only one regional institute is in the process of drafting the mapped. According to Pristaš et al. (2017) the most influencing problem on overall health reporting system is the regulatory frame of Croatian health. Although according to the regulations the Croatian Institute of Public Health has the public authority to plan, propose and execute activities of health information development, in practice that power is completely neglected together with the jurisdictions of each individual health institution. In accordance with that, country-level institutes have obligatory reporting to several higher-level institutes. Beside that they have a wide range of internal reports between department and connected branch offices, and withal, the reports are created through different technological basis. Consequently, this way of reporting leads to duplication of information and work, data of different quality (scope, content and logic), and in the end the emergence of different levels of reliability of reports and analysis (VrančićMikić et al., 2013). And importantly, beside all of that is the lack of information base for monitoring the efficiency of results and the effectiveness of set goals. Upon that, caused by the same problem of variety of data, the concept of secondary data use on activities such as health services research has not yet been incorporated in Croatian legislation and will take multi institutional efforts (Fišter et al, 2017). Hence, an integrated reporting health care system would enable internal efficiency and effectiveness measurement, but also the contribution of researchers through application of statistical methods (Asandului et al., 2014,Vitezić et al., 2016,Vitezić et al., 2017).

Figure 1 *Current reporting system of four regional public health institutes of Croatia and proposed changes*



Source: Authors

The reporting system of the four regional institutes includes a wide range of financial and nonfinancial data exchange through numerous internal and external reports that are often duplicated with regard to different users. For example, the Epidemiology department sends working reports monthly to the Croatian Institute of Public Health and Croatian Health Insurance Fund. The Ecology department reports on different basis (daily, monthly, yearly…) to the Croatian Institute of Public Health, to the Ministry of Agriculture, sanitary inspection, other institutes etc.We consider it appropriate and necessary for all data to be in one central database.Therefore, we propose the CroatianInstitute of Public Health as the central data collector in today's and future-facing digitalisation in the era of Big Data. Only through a central collecting data reporting system non data duplication and especially, validity and transparency of data can be assured. On the other, in internal reporting the departments mainly report themselves to other departments or higher-levels. To improve the transparency we suggest Controllingdepartment as the internal data collector and proactive analyst. Besides that, we emphasis as important for every institute to create own organizational mapped flow report processes as a perquisite for implementation of efficiency and effectiveness measurements.

4. The starting point for measuring the efficiency of public health services in Croatia

On the basis of previously elaborated cognitions, it can be concluded that performance measurement, i.e. the efficiency and effectiveness of particular programs and activities, and generally public health services, at the level of the surveyed institutions, as the backbone of the public health system in Croatia, has not been applied at an adequate level. In order to enable a systematic measurement of the efficiency and quality of the services provided, it is necessary to

provide a responsive, purposeful and efficient external reporting system and, above all, an adequate internal reporting system.

Over the past thirty years there has been a dramatic growth in health system performance measurement and reporting. Nevertheless, health systems are still in the beginning of performance measurement and much more needs to be done for improving its effectiveness (Smith et al., 2009). Population health has traditionally been captured in broad hard outcomes, such as standardized mortality rates, life expectancy and years of life lost. However, outcome-oriented approach to managing performance may not always be appropriate. Most notably, it is often difficult to assess the extent to which variations in health outcome can be attributed to the health system. Mortality often occurs long after the care has been given.

Process measures based on scientific evidence which links them to effective outcomes (sometimes referred to as intermediate outcome measures) are generally recognized as the most useful indicators (Donabedian, 1966, Lester, Roland, 2009). Measures of the processes of care can be influenced more directly by the organizations whilst measures of health outcome exhibit a great deal of variation beyond health system control. Examples of useful process measures include appropriate prescribing, regular blood pressure monitoring for hypertension or glucose monitoring for diabetics (Naylor et al., 2002). Also, to meet the demands of many stakeholders in the health system, it is necessary to think about measuring performance as a multidimensional system. This approach is a reflection of strategic thinking and inclusion of all interested stakeholders. Balanced scorecard(BSC) is a useful tool for integration the multidimensional nature of health-services performance. It also allows managers of public health unit to benchmark performance to set mission, vision and strategy. BSC application is very broad in the health care system all over the world (Lovaglio, Vittadini, 2012,Yilmaz, Erdem, 2015, Vitezić et al., 2017).

For example, The Quality and Outcomes Framework is a pay-for-performance scheme (2008) in the United Kingdom and itconsists of approximately 140 measures based on evidence or professional consensus. The majority (65%) of indicators are focused on clinical areas, and the use of a balanced scorecard approach is reflected in a range of clinical, organizational and patient focused elements in the framework (Lester, Roland, 2009).

Campbell et al.(2002) conclude that ideal qualities of a performance measure are: acceptability: acceptable to both those being assessed and those undertaking the assessment; feasibility: valid and reliable consistent data available and collectable; reliability: minimal measurement error, reproducible findings when administered by different raters (inter-rater reliability); sensitivity to change: has capacity to detect changes in quality of care; predictive value: has capacity to predict quality of care outcomes.
Examples of indicators at the level of a particular institute of public health should be focused on their main activities combined into six joint organizational units. Taking into account the above-mentioned assumptions in the creation of efficiency indicators, the calculation of such indicators within a particular institute should certainly be the practice of the planning and analysis department, whose purpose is to provide a relevant information base for making management decisions about improvement measures within the organizational system. Based on the conducted analysis we propose key indicators for efficiency and effectiveness measurement of public health services in Croatia, at the level of public health institutes.

Table 1 *Proposal of key indicators for efficiency and effectiveness measurement*

Efficiency		Effectiveness
Financial indicators	**Non-financial indicators**	**Outcomes**
$\frac{\text{Total costs}}{\text{Plan or previouse year}}$	$\frac{\text{Number of service by type}}{\text{Plan or previouse year}}$	• Increase in total quality of public health services.
$\frac{\text{Total costs}}{\text{Department}}$	$\frac{\text{Number of realized services}}{\text{Effective working hours}}$	• Increasing in the quality of internal processes.
$\frac{\text{Total costs}}{\text{Number of employees}}$	$\frac{\text{Number of published proffesional and scientific papers}}{\text{Number of employees}}$	• Increase of innovative solutions.
$\frac{\text{Market realized revenue}}{\text{Total revenue}}$	$\frac{\text{Types of diseases}}{\text{Previouse year}}$	• Improvements of prevention effectiveness.
$\frac{\text{Revenue from budget}}{\text{Total revenue}}$	$\frac{\text{Number and amount of external suported projects}}{\text{Number and amount of internal supported projects}}$	• Efficiently use of external sources of financing.

Source: Authors

Rationality represents one of the most important principles in the sector of public institutions. Therefore, financial indicators are needed to signify its achieved level. Non-financial indicators that are statistically tracked will indicate the efficiency through a larger number of performed services, published papers, external supports of projects and fewer diseases. All that together should lead to greater effectiveness measured through quality improvement of provided services, and thus better prevention. Further, these indicators serve as an important input to health care policy makers at the national level. In this respect, integration of efficiency and effectiveness indicators into the external reporting system is expected.

5. Conclusion

Public health as the science and art of preventing disease, prolonging life and promoting health through the organized efforts of society is the determinant of a developed and effective health system. Performance measurement becomes particularly important in the light of financial pressures and concerns over long-term financial sustainability experienced in many health systems, as decision-makers seek to ensure that available health care resources are used efficiently for proclaimed health benefits. As a starting point, i.e. the precondition of measuring efficiency and effectiveness, it is certainly the establishment of an adequate reporting system. Only carefully co-oriented national performance measurement and reporting systems can assure avoidance of data duplication, non-transparent information and dysfunctional consequences.

The public health system in the Republic of Croatia is organized through health and public health institutes at county level and one national institute which is the coordinator of all the regional institutes. The results of the conducted analysis through survey, interviews and available statistical data, discovered many different financial reports and statistics these institutes collect and send to the authorities and other upper-level institutes, but also the lack of efficiency and effectiveness measures. According to the results obtained, changes to current reporting system of four regional public health institutes of Croatia are proposed. As far as external reporting is concerned, the Croatian Institute of Public Health was suggested as the central data collector in today's and future-facing digitalisation in the era of Big Data to avoid aforementioned inconsistencies. In the area of

internal reporting, to improve the transparency and to meet the requirements for measuring efficiency and effectiveness on the level of particular institute, we suggest Controlling department as the internal data collector and proactive analyst. Also, key indicators for measuring efficiency and efficiency are proposed, through financial, non-financial and outcome levels.

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