

MODEL OF INTEGRAL HEALTH CARE: SEEKING THE EXCELLENCE OF SERVICE QUALITY WITH COST OPTIMIZATION

MODELO DE ATENÇÃO INTEGRAL À SAÚDE: BUSCANDO A EXCELÊNCIA DA QUALIDADE DO SERVIÇO, COM OTIMIZAÇÃO DE CUSTOS

MODELO DE ATENCIÓN INTEGRAL A LA SALUD: BUSCANDO LA EXCELENCIA DE CALIDAD DE SERVICIO CON OPTIMIZACIÓN DE COSTOS

José Edson Lara

Fundação Pedro Leopoldo e FATEC PR e Faculdade de Tecnologia de Curitiba – PR
jedson.lara10@gmail.com

Ary Célio Oliveira

Faculdade Unimed
aryceliovix@gmail.com

Thalles Augusto Tissot-Lara

Principal Investimentos
thalleslara@gmail.com

Luiz Rodrigo Cunha Moura

Fundação Pedro Leopoldo
luizrcmoura@gmail.com



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ABSTRACT

Financial sustainability has been one of the most worrying aspects of health systems, regardless of the country's stage of development. Thus, the purpose of this study is to analyze the value generation (EVA) and the possible cost reductions provided by the adoption of the Primary Health Care (PHC) Model. This is an exploratory and quantitative research with the use of the EVA (Economic Value Added) model and the system dynamics approach. The study connects the System Dynamics framework with the (EVA) to achieve cost savings in (PHC). The main results indicate that the Medical Cooperative was able to generate economic value of R\$ 15.8 million in 2018 and the migration of care procedures to the PHC model could reduce costs of about R\$ 330 million over a 10-year period. Theoretically, this investigation contributes to the application of a concept to a complex context. Methodologically, the contribution is the applicability of EVA and the use of system dynamics to analyze scenarios. The implementation of the PHC Model represents an important initiative in addressing the enormous management challenges in the area.

Keywords: Primary health care; Value generation; Medical Cooperative.

RESUMO

A sustentabilidade financeira tem sido um dos aspectos mais preocupantes dos sistemas de saúde, independentemente do estágio de desenvolvimento do país. Assim, o propósito deste estudo é a geração de valor (EVA) e as possíveis reduções de custos com a adoção do Modelo de Atenção Básica à Saúde (APS). Esta é uma pesquisa quantitativa exploratória com a utilização do modelo EVA (Economic Value Added) e da abordagem de dinâmica de sistemas. O estudo conecta a estrutura do System Dynamics com o (EVA) para obter economia de custos no (PHC). Os principais resultados indicam que a Cooperativa Médica conseguiu gerar valor econômico de R\$15,8 milhões em 2018 e a migração dos procedimentos assistenciais para o modelo de APS pode reduzir custos em cerca de R\$330 milhões em 10 anos. Teoricamente, o trabalho contribui para a aplicação de um conceito a um ambiente complexo. Metodologicamente, a contribuição é a aplicabilidade do EVA e o uso da dinâmica de sistemas para análise de cenários. A implantação do Modelo de APS é uma iniciativa importante para enfrentar os enormes desafios de gestão da área.

Palavras-chave: Atenção primária à saúde; Geração de valor; Cooperativa Médica.

RESUMEN

La sostenibilidad financiera ha sido uno de los aspectos más preocupantes de los sistemas de salud, independientemente del estado de desarrollo del país. Así, el propósito de este estudio es analizar la generación de valor (EVA) y posibles reducciones de costos con la adopción del Modelo de Atención Primaria de Salud (APS). Es una investigación cuantitativa exploratoria utilizando el modelo EVA (Valor Económico Agregado) y el enfoque de dinámica de sistemas. El estudio conecta el marco de dinámica de sistemas con (EVA) para lograr ahorros de costos en (PHC). Los Principales resultados indican que la Cooperativa logró generar un valor económico de R \$ 15,8 millones en 2018 y la migración de los procedimientos de atención al modelo APS puede reducir los costos en aproximadamente R \$ 330 millones en 10 años. Teóricamente, el trabajo contribuye a la aplicación de un concepto a un entorno complejo. Metodológicamente, la contribución es la aplicabilidad de EVA y el uso de dinámica de sistemas para el análisis de escenarios. La implementación del Modelo de APS es una iniciativa importante para enfrentar los enormes desafíos de gestión en el área.

Palabras-claves: Atención primaria a la salud; Generación de valor; Cooperativa Médica.

INTRODUCTION

The purpose of this article is to analyze the generation of value of a medical work cooperative that has sought to implement the integral health model. On the one hand, international evidence demonstrates that health care systems, based on a strong orientation towards primary health care, present

better and more equitable results. These systems are more efficient, and make it possible to free resources to meet general needs. Also, they provide greater satisfaction for users when compared to systems with poor guidance for primary health care. Additionally, they are able to improve equity, because they are less costly for individuals, ensure greater efficiency of services by saving time in consultations. Add to that the fact that they reduce the use of laboratory tests and allow reducing hospitalizations for conditions sensitive to primary care, such as angina, urinary infections, chronic obstructive pulmonary disease, among many others (PAN AMERICAN HEALTH ORGANIZATION - PAHO, 2013; LEWIS, 2018).

In a responsible way, the generation of value expresses the final objective of companies, presenting sustainable development in relation to the expectations of their stakeholders, oriented towards a multi-integrated future (SCHWAB, 2018). It is not just a question of obtaining short-term accounting profits, but of having managers focus on long-term returns, and willing to adopt views, with a perspective predominantly characterized by the ability to see the business from the outside, and to glimpse opportunities for generating incremental value (WYLLIE *et. al.*, 2016; COPELAND; KOLLER; MURRIN, 2012). In this way, the generation of value in the organization aims at a balance between organizational performance, in its economic, social, and ecological dimensions, with the objective of creating value for all the stakeholders of an organization.

Some researches have been using systems dynamics in analyzes of organizational management, with works developed in the areas of maintenance, logistics operations, strategy, sales and operation planning, tax, marketing, sustainability and financial. Regarding the health sector, dynamic systems modeling has addressed specific health care management issues, such as health workforce planning and emergency healthcare provision (OLMEN; MARCHAL; RICARTE; VAN DAMME; VAN BELLE, 2019), health problems related to weight (MEHRJERDI, 2012), showing an effect of the provision of joint health care by different sectors (CAREY *et al.*, 2015). However, even in the health sector, there is an effort to use this approach in management issues, as we can mention, for example, the study by Mehrjerdi (2012), which deals with the cost control of a change from the *free-to-work* service to the *self-paying-service*.

The dynamics of systems are essentially interested in the analysis of the behavior of complex systems over time and the simulation of this behavior, using computational tools (ZVERKOVA; KUZISHCHIN; SABANINC, 2019). In the scope of business, three applications are proposed by Bastos, (2003): 1) Investigation and problem solving: it deals with the search for understanding the dynamic structure of a complex system that generates a certain problematic behavior over time; 2) Solution design: it tries to build a quantitative model of computer simulation that allows exploring the consequences of certain decisions and, thus, proposing scenarios, resources and policies that can minimize the problems analyzed, and define new organizational procedures; and, 3) Learning labs: they have the objective of creating what is called “micro worlds” or “managerial flight simulators”, aiming at developing an organizational learning and training environment, either individual or in group.

It is clear, from this brief discussion, that the use of instruments can play a significant role in the development of health policies, but studies in Brazil with this approach are scarce, most notably in the field of the generation of value. This is the biggest problem with researches in this area, and particularly for this investigation.

The objective of this article is to partially fill this gap by analyzing a Medical Work Cooperative and its health care model. It investigates the economic effects that emerge from the transition from the conventional health model to one based on Primary Health Care (PHC) and presents evidence on the cooperative's capacity to generate economic value.

The most consistent academic justification for conducting this study is the lack of content that analyzes the system and the cost management process in the important area of health, with technological resources such as System Dynamics. This technology allows the establishment of scenarios, useful as elements for management decision-making, already confirmed in other business areas. Furthermore, studies on costs and their reduction possibilities are essential strategic elements, especially in a country like Brazil.

LITERATURE REVIEW

A brief health care scenario in Brazil

Certainly, the greatest asset of the human being is health and, thus, in a nation as a whole, for sure, health is the most important assets for the entire collectivity (ROSE, 2010). It is a “state of complete physical, mental and social well-being, and not merely the absence of disease” according to World Health Organization – WHO (2018). Since the complete state of well-being is multifactorial in its determinants and causes of fragility, the approach to health, whatever it may be, requires actors representing multiple sectors of society and multidisciplinary in its constitution, in order to guarantee the indispensable breadth in the discussions regarding the health care model (PORTER; TEISBERG, 2007). Nevertheless, even if governments and institutions seek to develop health care by making budgets increasingly larger, the results remain unsatisfactory (HUSSEY *et al.*, 2015).

According to estimates based on data from WHO (2018) the health expenditures moved resources equivalent to 9.3% of Brazilian GDP in 2018, or R \$ 637.00 billion. Of this total, 43% were public resources, with expenditures of R \$ 118.10 billion from the federal government, R \$ 70.30 billion from state governments and R \$ 84.90 billion from municipal governments. When it comes to the private sector, it is estimated that R \$ 181.20 billion were paid by families and companies to fund medical and hospital assistance plans (supplementary health) and R \$ 182.50 billion in private expenses (National Association of Private Hospitals - ANAHP, 2019). International comparisons point to a positive relationship between the share of elderly people in the population and health spending, as a proportion of GDP (ANAHP, 2019; WORLD HEALTH ORGANIZATION, 2018).

With regard to Brazilian private health, which still uses a health care model based on illness, the situation is even more critical, as the sustainability of Health Plan Operators (PAHO) is strongly threatened. Health management in this sector faces enormous difficulties in terms of predictability. Therefore, the scenario that presents itself to health in this century has been marked by diverse global changes, such as the epidemiological transition, the demographic transition and the technological transition, as in Covid 19 Pandemia. Although these transitions began in the twentieth century, they still exert strong pressure on health systems around the world. Additionally, other factors inherent to culture and to each society make balancing health care a constant challenge for governments and institutions.

The “global” situations (epidemiological, demographic and technological transition) occur in different degrees in developed countries compared to those that are developing and, in Brazil, there is also an increase in the prevalence of overweight (55%) and a high incidence of obesity in the population (nutritional transition). The regulation of the supplementary health sector by Brazil's National Regulatory Agency for Private Health Insurance and Plans (ANS), linked to excessive regulatory standards in which, the value of the monthly fee has, in the actuarial calculation, the age group as being the main reference point. And this in a health care model that favors the production of procedures linked to the disease can be much greater than the contributions of a lifetime. Not only is the difficulty to provide continuous care evident, but the number of Health Plan Operators (OPS) that already have more than 20% of the total number of users over the age of sixty is growing, ANS stresses that the OSP needs to be on alert when the percentage of elderly people in the portfolio exceeds 15% of the total beneficiaries.

The public sector promoted the change of model, since the insertion of Primary Health Care (PHC), more than two decades ago, but it lacks adequate infrastructure and incentives, which represents an evident lack of access, deficient comprehensive care, reduced continuity and precarious coordination of care, in addition to weak network articulation. The prospects become even more frightening from the point of view of the health economy, whether in the public or the private area, as statistics indicate that 10% of a population with the highest burden of disease (without adequate care) can even consume from 60% to 70% of assistance resources (National Health Agency [ANS], 2009).

With Primary Health Care (PHC) as a central element, Comprehensive Health Care (CHC) brings into focus the need to obtain and record the health information of individuals, from a constant alert state, aided by the population-based approach, the latter focused on health promotion and risk and disease prevention. Therefore, care comes to exist as a common element in the approaches of different levels of care, as an axis of remodeling and reorientation of a new model. Both at the individual and population levels, care, if well-coordinated, can act as a point of magnetism in the health care network, reinforcing the convergence of different services, around an even greater purpose: health as a synonym of a better quality of life for beneficiaries (LEE; HILL; MC CONVILLE, 2012). This way, based on expanded care, Comprehensive Health Care promotes the resurgence of a relationship between people and health services based on the perception of a new added value: a system is as better as the health and quality of life of the beneficiaries who depend on it improve their health (PORTER; TEISBERG, 2007). Thus, it is necessary to understand the scenario and adopt coping measures in all areas of health management. In relation to the integrality of care, the focus needs to be also prospective and centered on the person, unlike the usual care approach, which is retrospective, based on the previous history of the disease. Comprehensive networked care constitutes the basis of a new health care model, integrating health promotion actions, surveillance, risk and disease prevention at different levels of care, as well as giving the necessary emphasis to both assistance and rehabilitation. There is a need to put people at the center of attention, so that their needs are met, individually and collectively. What is sought is to allow both patient guidance and also maintaining a broad view of people's living conditions so that they remain healthy (quality).

It is unequivocal the valorization of comprehensive health care based on a perspective focused, mainly, on primary health care, resolving and articulated with the other levels of care, having as great allies to health promotion the surveillance and risk prevention and diseases (JENKINS, 2007). The comprehensive change of a health care model is a task of the State, with the engagement of the whole society. In this context, it is necessary to invest consistently in health education, in a way that new contours can emerge to face the current scenario. Increasingly, efforts are being made to promote healthy lifestyle habits (modifiable risk factors), prevent what can be avoided and monitor / manage, in the best possible way, what has no cure and which represents the greatest burden in terms of disease in the population (ANDERSON; REINHARDT; HUSSEY; PETROSYAN, 2019).

Chronic non-communicable diseases (CNCD) have been highlighted as a worrying public health problem around the world. This phenomenon is the result of population aging, which has changed the epidemiological profile of diseases, reducing infectious diseases and increasing chronic diseases (GUPTA, 2016). Chronic non-communicable diseases (NCDs) are one of the biggest public health problems today. Estimates by the World Health Organization (WHO) indicate that NCDs are responsible for 71% of a total of 57 million deaths worldwide in 2016 (WORLD HEALTH ORGANIZATION - WHO, 2018). In Brazil, NCDs are equally relevant, having been responsible, in 2016, for 74% of the total deaths, with emphasis on cardiovascular diseases (28%), neoplasms (18%), respiratory diseases (6%) and the diabetes (5%) (WHO, 2018). According to the WHO, a small set of risk factors accounts for the vast majority of deaths from NCDs and a substantial fraction of the disease burden due to these diseases. Among these, smoking, inadequate food consumption, physical inactivity and excessive alcohol consumption stand out (WHO, 2018).

The international literature almost unanimously asserts that primary health care, provided it is properly constituted, within the parameters already established in the scientific literature and in international experience, has an enormous potential to offer better quality care and, in the long run, would reduce health care costs, a fact that was also observed in private financing models, such as in supplementary health, as it is known, in Brazil, the mode of prepayment of medical care (LEWIS, 2018). Today, it is almost universally accepted that the four essential attributes of primary health care are: (a) access; (b) coordination; (c) longitudinality and (d) comprehensiveness or comprehensive care. These were defined by Starfield (2002) as "essential attributes" of PHC. Preventive medicine is a widely adopted practice in medicine, and it continues to propose new strategies, assisting both in health promotion and

in the prevention of risks and diseases, and also has care as an axis of reorientation of the health care model. The best prospects point towards the significant contribution of new technologies, characterized in the context of Industry 4.0, such as neurotechnologies, the Internet of Things, biotechnologies, nanotechnologies, Artificial Intelligence, digital printing and virtual and augmented realities (SCHWAB, 2018).

The intense technological incorporation in medical and paramedical procedures provides substantive advances. However, it causes an increase in service costs, without the possibility of provision of resources. This reality generates a perverse logic, in which the physicians' perceptions have been replaced by the sensors of the devices, advancing technicalities to the detriment of welcoming and humanism. Another aspect that demands attention is the fact that the technological insertion in health is of a non-substitutive type and with an ever increasing cost, both for the new component and for the previous one. But, interestingly, it finds no parallel in any other industry segment.

The advance of technicality to the detriment of welcoming and humanism is devastating, because, on the one hand, there is a strong call for the generation of financial gain from the use of machines, medicines and highly specialized procedures (technological transition) associated with the interests of strong economic groups; on the other, a timid stimulus to health promotion in populations, as well as insufficient policies to prevent risks and preventable diseases, in a waste of opportunities, since Chronic non-communicable diseases (NCDs) are mostly associated with modifiable behavioral risk factors. The situation is even more critical when the health system, just like Unimed (a Brazilian medical work cooperative) does, has a low score for Primary Health Care, which leads to a shift in demand to specialized secondary care, focusing on technology and, soon afterwards, for hospital care interventions (tertiary), with enormous financial gain in both secondary and tertiary care, with health conditions that are not adequately managed in PHC, in an unsustainable logic due to the high cost it represents to the health system. Likewise, government policies in many countries still seem to be dissociated and unconnected to this context (PETTITT *et al.*, 2016).

The non-substitutive characteristic of technologies in the area of health means that the old methods subsist and continue to be used in the same way or even with more emphasis, which raises the cost in a frightening way. On this path, a strong appeal for the use of new equipment can generate a high commercial demand, in favor of the balance point and for a quick financial return; however, given the weak training of health professionals, the lack of robust scientific criteria, the disparity of protocols in many services and the fragility of the ethical attitude of health professionals, the use of a certain new method may also be being driven unrelentingly by aspects that do not bring results to the health sector (BUSS, 2003). At the same time, new approaches and interventions such as population screening emerged from societies, which are not always in line with the best facts, often leading to over diagnosis and policies that encourage the use of machines placed at the service of the search for the disease, from the early diagnosis, and forgetting the individual.

Modern society, unaware of scientific aspects, and motivated by a mistaken culture of added value in health, maintains the need to seek tirelessly and unrestrainedly new technologies, having the fear of the sinister circumstances of life as a pillar. This combination constitutes a constant threat to the measured posture that a doctor may have in PHC, as the patient has been assuming demanding behavior, confusing access to health with the possibility of using machines, which are not free from damage, in addition to having a high cost (PETTITT *et al.*, 2016).

For the most part, the practice of using isolated technology for screening does not change the distribution curve of the disease in the population and does not even change mortality (ROSE, 2010). Thus, there is an interest in generating high production of procedures, which ends up raising, even more, the cost of medical care. Simultaneously, the use of new technologies brings advances, in treatments and results, capable of prolonging life, but at an unsustainable cost in the medium term (PAREDES, 2018). The impact of technology on the cost of health is significant and, when linked to a health care model driven by disease, demand and the remuneration of the production chain, determines a situation that has compromised the sustainability of health systems. The exaggerated specialization of medicine increasingly

requires sophisticated methods, whether for diagnosis (expensive equipment) or therapy (expensive drugs), in addition to the increasing overuse of orthoses, prostheses and special materials. It is also considered that most of the time such use also occurs uncritically. This theme is recurrent and affects the economic and financial balance of the Pan American Health Organization (PAHO), and this discussion is fundamental in the evaluation of the health economy, in addition to providing foundations for the judiciary, where discussions take place without understanding all sides of the problem, which leads to partial decisions, supporting unprofessional practices, and with a clear bias, even though the intention is to preserve the patient's fragility in the face of the economic power of companies in the sector.

Value-based management

The financial sustainability of organizations is a topic that has been discussed both in the academic and in the corporate environment, leading companies to guide their management in the search for the creation of value. This search aims not only to meet the wishes of shareholders, but also to enable organizations to become increasingly attractive to their creditors and other stakeholders. In developed countries, this form of management is paved by the greater separation between shareholders and professional managers, as well as by the increasing practice of using company shares in the variable remuneration of top management (COPELAND *et al.*, 2012). Nevertheless, the process of creating shareholder value is mistakenly seen by most managers as conflicting with the organizational sustainability process, as for them the search for sustainability in its full sense, both in social and environmental performance, is reflected in the sacrifice of profit.

The creation of value is not directly related to beliefs and values, individual or corporate, nor is it only focused on the economic or ethical perspective of how management is conducted in an organization. In fact, it is an independent driving force, from the moment in which it is well understood at all organizational levels as a way of survival in a market where, if not, this same market is in charge of eliminating it (KAISER; YOUNG, 2014). To manage the generation of value, it is necessary to focus on the return of cash flows in the long term, seeking to balance with the short term objectives, not allowing the latter to harm sustainable financial generation. According to financial and economic theories, capital investments are made when agents project gains greater than the capital invested. One of the main objectives in corporate finance is to maximize the value of organizations, and this can be achieved by seeking to outline the relationship of financial decisions, corporate strategies and the value of the organization (DAMODARAN, 2012).

The Economic Value Added (EVA) covers operating profit for a period less taxes to be paid and weighted costs of equity and third parties, leaving only the amount generated by the organization in the period, that is, in practice, it is the minimum required operating result by capital owners - creditors and shareholders (O'Byrne, 2014).

In algebraic terms, EVA can be presented as follows:

$$EVA = \text{NOPLAT} - \text{Cost of Capital Invested} \quad (1)$$

Equation 1 can be rewritten as:

$$EVA = (\text{ROIC} - \text{WACC}) \times \text{Invested Capital} \quad (2)$$

In equation 2, ROIC portrays the return on invested capital, being obtained by the NOPAT (*net operating profit after less taxes*) / invested capital ratio, and WACC (weighted average capital cost) represents the opportunity cost of capital employed (owned and the 3rd).

In cases in which the company is not leveraged, the financial cost refers only to the profitability desired by the use of equity. This can be obtained using the CAPM (Capital Asset Pricing Model) model:

$$R_e = R_f + \beta \times (R_m - R_f) \quad (3)$$

Being:

R_e = expected return on the asset;

Rf = risk-free rate;

β = index that relates the asset to the return of a market portfolio and portrays the systematic risk of the asset;

Rm = expected return by the market portfolio

A value-based healthcare system (*Value Based Care* - VBC) aims to improve quality by offering service delivery that is more aligned with patients' needs (DURVASULA et al., 2018).

According to the authors, a cost method should not only indicate the cost of a product, but also the costs of its process, step by step, operation by operation. Only then can managers know the detailed costs of products/services, check where there are weaknesses and act to improve them. The big challenge in cost management will be the change of focus: instead of reporting the facts that occurred in the past, such activity should monitor the actions necessary for the goals of the future. Specifically, the Economic Value Added (EVA) model, already used in other economic sectors, is the theoretical option to be applied in this study. Furthermore, the conjunction with the scenarios provided by the System Dynamics is a rare application in academic studies, constituting the theoretical challenge of this study.

METHODOLOGY

Unimed-ES (a medical work cooperative in the State of Espírito Santo) is committed to efficiency and cost optimization and to providing better services to users of the system, through the gradual implementation of the concept of primary health care. Therefore, this article is aimed at exploring the economic effects arising from this change, as well as analyzing whether the Cooperative currently generates value for its members. Therefore, it is an exploratory research of a quantitative nature based on a case study.

The unit of analysis and ambience of the study

The unit of analysis is Unimed Vitória (City of Vitória-ES), a medical work cooperative, which integrates the Unimed System in Brazil. The Unimed System in the state of Espírito Santo has 503,070 Customers, 3,945 Employees, 3,591 Members, own hospitals, specialty centers, laboratories, diagnostic units, oncology units, *home care* services and ambulances.

Primary health care has been one of the main directions of Unimed Vitória's assistance policy since 2013. This model of assistance is not focused on treating the disease, but on health promotion and disease prevention. From this new model, the Unimed Personal product was born, made available according to the needs of each patient, generating quality care and sustainability for the operator. The doctor is the patient's health manager, globally, responsible for the list, an average of 1,700 clients in the portfolio for each team. Unimed Personal currently has 72 doctors, who serve in eight units that performed 250,416 appointments in 2018, with 91.6% approval in a satisfaction survey by the beneficiaries.

Methodological procedures

The value creation of a Cooperative

In order to obtain the EVA, it was necessary to collect the following information:

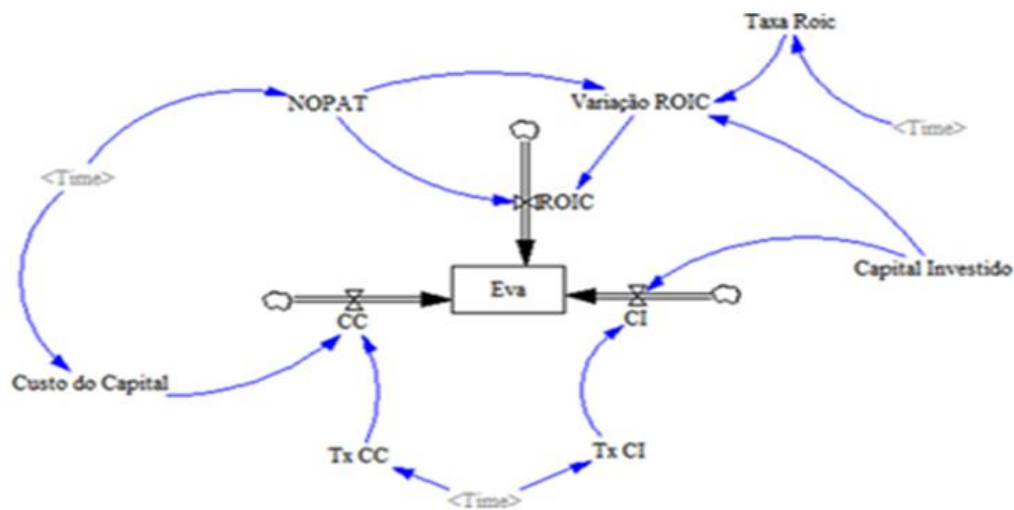
a) Cooperative's NOPAT, which reflects the result of revenues from health care operations (-) direct taxes (-) indemnifiable / retained claims (+) other net operating revenues (-) operating expenses (-) administrative expenses (-) expenses (+) financial revenue from free technical reserves (-) Income Tax and Contribution on adjusted income. Basic data were extracted from the Income Statement and Balance Sheet of 2018, with the necessary adjustments;

- b) invested capital, obtained by adding the need for working capital (difference between cyclical assets and liabilities) to the amount allocated to non-current assets;
- c) risk-free rate, provided by the real profitability of National Treasury Notes - NTN-B 2045 (3.41% p.a.) and an inflation forecast, adopted in this article, of 3.5% p.a.;
- d) unleveraged beta of the health sector (systematic risk) of an emerging country of 0.74, informed by Damodaran (2019);
- e) 5% risk premium, used in Felix, Locatelli, Fernandes & Ramalho (2016).

In addition to estimating value generation in 2018, the article sought to project future values using scenarios on the trajectory of the model's basic variables. The simulation can help managers define actions to achieve higher EVA goals, reaching the desired financial sustainability of the organization.

The simulations were performed using the system dynamics approach, and its operationalization is illustrated in Figure I, which details the flow and stock variables.

Figure I - Value generation according to the system dynamics method



Source: survey data

Costs avoided with the adoption of PHC

In the theoretical framework, it was registered that there is unanimity among specialists that primary health care, provided it is properly constituted, has great potential to offer better quality care to users over time, reduce assistance costs and promote the strengthening of service provider systems. Therefore, the article that is concerned with the financial sustainability of a health cooperative proposes to discuss, also, the possible impacts of migration from the traditional assistance system (General Portfolio) to PHC, considering the behaviors observed by the users of these two health systems of the cooperative.

In order to achieve the objectives, the frequency of use and the measurement of the assistance cost of elective consultations, emergency room consultations, exams, therapies and hospitalizations were raised. In the simulations, assuming that all beneficiaries who migrated from the General portfolio to the Personal portfolio would have the same behavior observed as PHC users. Table I shows the indicators of the assistance procedures, detailing the behaviors of the beneficiaries of the Personal Plan and those of the General Portfolio, in 2018. These indicators will be used to raise possible cost reductions when migrating from the traditional to the PHC system, and the results will be discussed in section 5 of this article.

Table I: Assistance indicators compared to the general portfolio and the personal portfolio

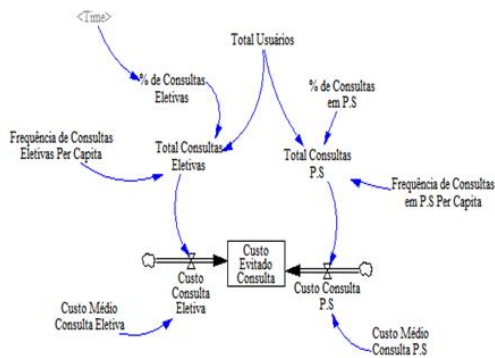
Assistance indicators	Personal portfolio	General Portfolio
Consultations		
Frequency of Elective Consultations Per Capita	4.34	4.78
Frequency of Consultations in Emergency Room Per Capita	1.3	1.2
% of Consultations in Emergency Room	25.29%	25.17%
Exams		
Exams by Consultation	2.29	3.55
Cost of Exams Per Capita	R\$ 20.12	R\$ 40.13
Frequency of Exams per Capita	9.94	16.96
Therapies		
Frequency of Therapies per Capita	3.59	3.62
Hospitalization		
Average Cost of Hospitalizations	R\$ 6,221.34	R\$ 10,777.77
Average frequency user / year Hospitalizations	15.40%	14.60%
% of ICSAP *	10.78%	17.33%

*Hospitalizations for conditions sensitive to primary care (ICSAP)

Source: survey data

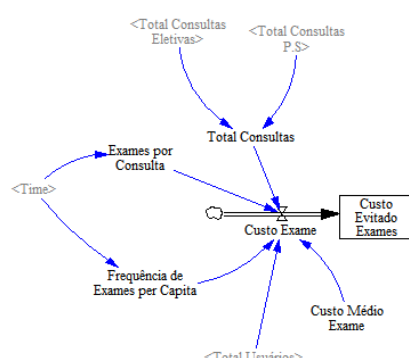
The pictures presented below illustrate the script used to calculate the avoided cost referring to the “consultations”, “exams”, “therapies” and “hospitalization” procedures in the system dynamics format.

Figure 2 - Avoided cost: elective consultation



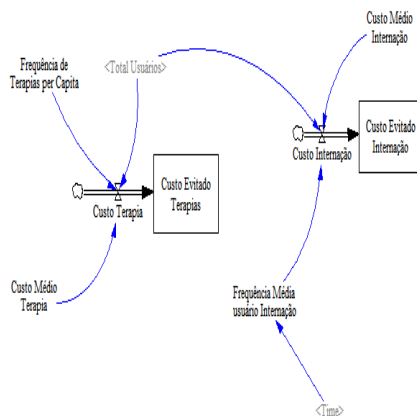
Source: survey data

Figure 3 - Avoided cost: examination



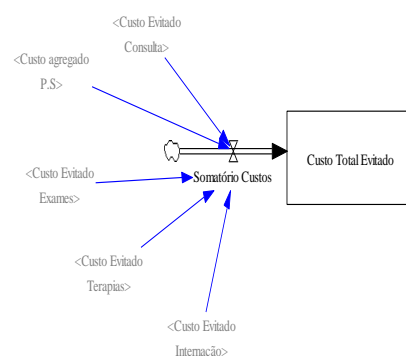
Source: survey data

Figure 4 - Avoided costs: therapies and hospitalization



Source: survey data

Figure 5 - Total cost avoided



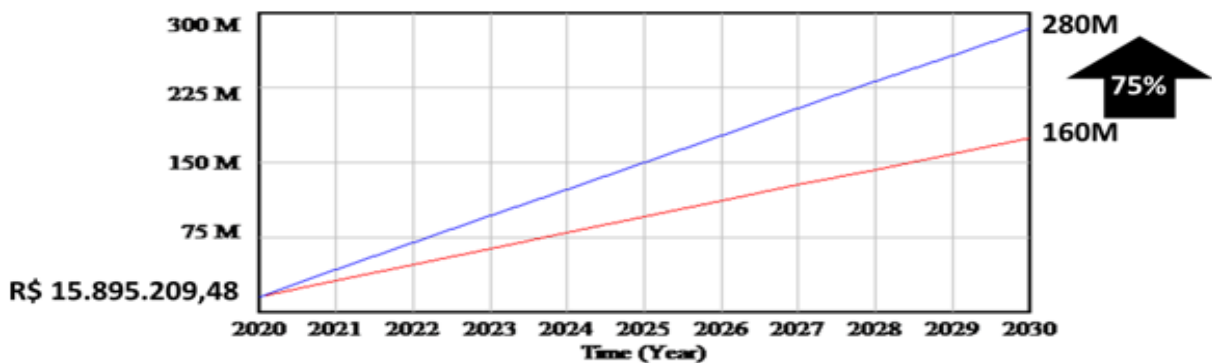
Source: survey data

RESULTS AND ANALYSIS

In accordance with the methodological procedures detailed in the previous section, the net operating result after deducting the adjusted Income Tax (Net Operating Profit After Taxes - NOPAT) of the Cooperative in 2018 reached the amount of R \$ 42,723,935.00 and the invested capital of R \$ 252,862,625.00. In turn, when using the CAPM (Capital Asset Pricing Model) (equation 3) and the values of the relevant variables, also presented in the methodology, an opportunity cost of capital (K_e) of the organization of 10.61% p.a. was obtained. Thus, a net operating return ($ROIC = NOPAT / \text{invested capital}$) of 16.89% was obtained in 2018. It can be concluded that Unimed-ES Cooperative was able to generate value, since ROIC was higher than cost of capital (K_e), with a spread of 6.28% in the year. When inserting these numbers in equation 2, the EVA of R \$ 15,879,773.00 was calculated.

Using the system dynamics approach it was possible to simulate the possible trajectory of the EVA variable, with changes in the predictor variables. Assuming, for example, a Hypothetical Scenario for the next 10 years with an increase in ROIC of 2% per year, a reduction in the Cost of Capital from 10.61% per year to 6.5% (rate slightly higher than the current SELIC (Special Clearance and Escrow System) rate) and an increase in Invested Capital of 10% per year, an accumulated EVA of approximately R \$ 280 million was obtained, which is opposed to a value generation of R \$ 160 million, which consists of the 2018 values projected for 2020, kept constant the model variables (Figure 6).

Figure 6 - Results of the simulation with changes in variables of the EVA model



Subtitle Current scenario
 Hypothetical scenario

Source: survey data

The R\$ 280 million EVA represents the value accumulated in 10 years, which corresponds to R \$ 28 million annually, which would translate into a 75% increase in value generation, in comparison with the estimated value for 2018. But, for that, according to the established scenarios, the cost of capital should decline 39%, the value of capital invested more than double and ROIC increase 22% in the period. For sure, increasing the Cooperative's efficiency while reducing costs would be the safest way to increase the organization's value generation, as can be seen from the information in Table 1, presented in the methodology. Therefore, it emerges as one of the priorities of the management of the Cooperative to achieve the migration from the General Portfolio to the Personal Portfolio.

Table 2 shows the values that could be achieved by this migration. It was admitted that when migrating from the conventional assistance system to the PHC, the beneficiaries of the general portfolio have the same behavior as the users of the Personal portfolio of the year 2018. With this premise and simulations using system dynamics, an avoided cost of R \$ 334 million was estimated over a 10-year period (Table 2).

Table 2: Cost avoided with PHC adoption: 2020-2030

Assistance Procedures	Current values (in R \$)
Elective Consultations	15,964,720.60
Consultations in Emergency Room	-1,387,793.95
Exams	63,1335,497.76
Therapies	1,576,482.52
Hospitalization	255,043,504.11
Total Avoided Cost	334,532,411.04

Source: survey data

Table 2 shows that, except for emergency room visits, the simulations point to a reduction in the costs of assistance procedures. The greatest reduction could be achieved in the costs of hospitalizations and exams. A substantial reduction in elective consultations is also expected.

The approach of this study focuses on a very specific application of the EVA model to explain Cost avoided with PHC in an institution. Thus, studies that allow objective comparison of results in a single case are apparently very scarce. However, it is possible to consider other references, with applications in very different contexts, in studies such as that of Durvasula; Kelly; Scleyer et al. (2018) on the importance of the collaborative and ongoing review process to ensure value-based care and reduce the cost of hospital care. Attempts to reduce costs in healthcare organizations have been carried out intensively, including often controversial decisions, Marino, James, Morgan and Lorenzoni (2017), that offer a study model on future trends in health care expenditure, possibly applicable to cross-country forecasts. The contribution proposed by Hussey; Malcaly; Chari et al. (2015), consists of a pay for performance; so, quite controversial. However, in the environment of the institution object of this study, this option was discarded, as others, as shown in the simulation, were assimilated. But it is not out of the question for future applications. Literature on health cost studies is not plentiful, yet it focuses on widely dispersed applications. It rarely addresses consolidated units, that is, a general health center in integrated care, as shown in the study by Nolte and Pitchforth (2014), in a bibliometric study, the available contributions. This state of literature invites, therefore, the challenge of continuing to study the topic, in the logic of this article.

FINAL CONSIDERATIONS

The overall aim of this research was achieved by adapting the EVA model and applying it to the environment of a health cooperative. It was possible to identify the cooperative's operational return, the cost of capital associated with the risk, and measure the value generation of the activity. From the perspective of the system dynamics, a simulation was presented that allows senior management to predict possible situations of value generation, to foresee mitigating actions for various risk situations and to implement strategic decision making.

As the generation of value is very sensitive to the operational result, the potential for cost reduction was investigated when migrating from the Current Model to a Model of Comprehensive Health Care. The possibility of a great saving of resources was verified, which shows the urgency to implement transformation measures of the current model that should not be limited to the studied unit, but should be adopted in the UNIMED System as a whole.

The process of changing the care model points, worldwide, to a convergence around Primary Health Care (PHC) as a strategy capable of better organizing the health care network, centered on the adoption of practices aimed at comprehensive care, based on its essential and derived attributes, whose technical-scientific development needs to be built on permanent continuing education, in order to guarantee both the diffusion and the alignment of applied knowledge as a factor that generates a new

reality for health care. The broad study of the theme allows us to deduce that in the current conventional management model, the patient is generally not seen holistically, that is, in its entirety in the clinical, technical, human, social, family and cultural dimensions. This is the change that is needed. However, such a change requires political measures aimed at the health needs of people and the technical requirements of professionals, in view of the context of an aging population, chronicity of diseases, functional limitations and social and family dependence.

The continuity and personalization of care rationalize resources and make the health system more profitable. It takes more time and more availability to treat and monitor patients efficiently and effectively, it is ineffective to collect tests and prescribe therapies without knowing it, being of great importance to focus on people's behavior, encouraging them to change their lifestyle, combating smoking and promoting exercise, for example.

A new frontier opens up to Comprehensive Health Care, which consists of a broad approach to health care based on the premise that staying healthy and with quality of life is a fundamental aspect in people's lives. For that, it is necessary to adopt a set of articulated and integrated practices that range from surveillance, health promotion, risk and disease prevention, assistance and rehabilitation, coordinated at different levels of health care to facilitate and organize the care path of each patient, based on an individual and personalized care plan within a desired health care network.

In conclusion, it should be noted that the simulations and the use of the system dynamics approach were not intended to predict the future state of a predefined set of variables, but rather to identify different trajectories that these variables could follow, generating different final states.

Therefore, in addition to carrying out simulations concerning the EVA model to identify the generation of value in the future associated with changes in corporate policies, the discussions presented in the article allow identifying some frontiers for new in-depth studies, such as:

- 1) Applying the systems dynamics to analyze the most critical work processes in terms of severity, urgency and tendency of phenomena that impact the health system;
- 2) Evaluate, with the use of this methodology, demands arising from the regulatory agents of the health system in Brazil and which strongly impact cooperatives and their financial sustainability.

The main limitation of this study concerns the scope of its analytical scope: the unity of Espírito Santo. This research group intends, then, to apply this systemic mapping model, through System Dynamics and cost simulations, in the other units of the organization, in Brazil.

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