



# Improving the value of healthcare systems using the Triple Aim framework: A systematic literature review

Petra Kokko<sup>a,b,\*</sup>

<sup>a</sup> Tampere University, Faculty of Management and Business, Kalevantie 4, 33014 Tampere, Tampere, Finland

<sup>b</sup> Finnish Institute for Health and Welfare, Performance Assessment of the Health and Social Service System Unit, Mannerheimintie 166, 00271 Helsinki, Finland



## ARTICLE INFO

### Article history:

Received 25 July 2021

Revised 11 February 2022

Accepted 16 February 2022

### Keywords:

Health policy

Health system

Triple aim

Value-based healthcare

Systematic literature review

## ABSTRACT

The notion of value-based healthcare has become increasingly important for healthcare institutions, and more and more countries are adopting its representative approach—namely, the US Institute for Healthcare Improvement's Triple Aim framework for optimizing health system performance in terms of population health, patient experience, and cost of care. In this study, using a five-step systematic review protocol and PRISMA methods we systematically review and analyze with descriptive and qualitative analysis methods literature on the results of using the Triple Aim framework for assessment at the health system level, especially the concept of balance among the framework's goals. Inclusion criteria were that the paper evaluated the policy-level impact of value-based healthcare movements based on the Triple Aim goals, discussing at least one of the goals or the balance. Our analysis shows a lack of consensus on the impact of each goal and on the concept of a balance between the goals, and a paucity of literature related to the pursuit of the Triple Aim at the health system level. To properly evaluate the impact of the value-based healthcare movement, a standard set of measures aligned with the context is needed. The results of this study are expected to contribute to the improved assessment of health system performance, development of the Triple Aim framework's measures, and ultimately, enhanced effectiveness in achieving healthcare goals.

© 2022 The Author. Published by Elsevier B.V.

This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>)

## 1. Introduction

Value-based healthcare (VBHC) has become an increasingly important strategy to ensure high-quality healthcare with simultaneous cost-efficiency [1–3]. The roots of VBHC are a century-long quality movement that has shaped, and continues to shape, the focus of healthcare development [4]. In 2000, the World Health Organization published three fundamental objectives for all health systems globally—namely, improvement of health of the population, response to people's expectations, and financial protection against the cost of ill health [5]. In 2006, Porter and Teisberg [6] called for value for patients in healthcare delivery, defining *value* as the health outcomes per dollar spent [7]. In 2008, Berwick, Nolan, and Whittington [8], working as researchers for of the Institute for Healthcare Improvement (IHI), then unified knowledge built from the WHO's report, the quality movement, and the value for patients ideology under the Triple Aim framework. The IHI introduced the Triple Aim concept with a view to improving popu-

lation health and patient experience while decreasing the costs of care [8]. This concept became the overarching objective of health reform during the Obama era and is addressed profoundly in the Patient Protection and Affordable Care Act (PPACA) [9,10].

Transformation “from volume to value” manifests in health care in several ways—with shifts to alternative payment models, new models of provider organizations [2,11], and new models of integrated care [12,13]. To evaluate these programs, numerous conceptual models have been developed, many of which contribute to Triple Aim [11,13,14]. Moreover, Triple Aim has influenced national health policies [3,10,12,15,16] and performance management frameworks [17,18].

Already in 2007, the IHI recruited organizations internationally to collaborate in implementing the Triple Aim [10]; as of 2018, it had more than 100 partners globally. New Zealand adopted Triple Aim nationwide in 2010 [15], and the Health Council of Canada proposed it as a relevant national framework for healthcare reform and value creation in 2013 [16]. The Nordic countries have also implemented the value-based strategy in their health systems [1,3]. In their adoption, the wording of the Triple Aim goal varies according to different countries' national health policies; for example, in

\* Corresponding author.

E-mail address: [petra.kokko@tuni.fi](mailto:petra.kokko@tuni.fi)

New Zealand, the goals are “improved quality, safety and experience of care, improved health and equity for all populations, and the best value for public health system resources” [15]. Since its inception, the Triple Aim has been further developed with an additional aim—employee wellbeing—under the concept of a Quadruple Aim (cf [19].) although we focus on the original Triple Aim concept.

The IHI has defined the measures of Triple Aim in ‘A Guide to Measuring the Triple Aim: Population Health, Experience of Care, and Per Capita Cost’ [20], which has been interpreted and adapted in other contexts and uses cases as a general framework for measuring the Triple Aim [18,17]. In the Netherlands, the Triple Aim framework was used to operationalize a population health management (PHM) program [18]. We have taken this Dutch model as an illustration of the IHI’s guideline to elaborate the use of the Triple Aim framework. Below, we give examples of how the Triple Aim goals have been evaluated.

*Population health* aims to improve the overall health of populations, including traditional health services, preventive care, and health promotion [20]. Stiefel and Nolan [20] divided the evaluation of population health into the three following domains: (i) the health outcomes of mortality, health and functional status, and their combination for healthy life expectancy, (ii) the disease burden (incidence and/or prevalence of major chronic conditions), and (iii) behavioral and physiological factors. In the Dutch model, participation and functioning or quality of life are included in the assessment of population health and its main determinants [18] as supported by other PHM initiatives internationally [17].

In the IHI framework on the *experience of care*, two perspectives are considered—patient experience and quality of care. The first perspective is that of the individual who interacts with the healthcare system and evaluates care. The second is that of the healthcare system, which focuses on designing a high-quality experience for patients, defined by the six key dimensions of improvement of the Institute of Medicine—safety, effectiveness, timeliness, efficiency, equity, and patient-centeredness [20]. The Dutch framework emphasizes the dimensions slightly differently, evaluating patient safety, timeliness, responsiveness, and effectiveness under the quality of care domain and accessibility and efficiency separately [18]. In a comparative study by Hendriks et al [17], effectiveness is replaced with domain effectivity, and instead of efficiency, the support given to patients is evaluated, as is also done in Struijs et al.’s [18] framework.

The total cost per member of the population per month is the desirable measure of *per capita cost*. Sites can also use high-cost services (e.g., hospital or emergency department [ED] utilization rates and/or costs) that account for a substantial share of healthcare expenditures [20]. However, some authors argue that cost can also be evaluated through the lenses of demand-side costs (i.e., how and by whom the services are paid for), integrator costs (i.e., health plan costs), and supply-side or providers’ costs (i.e., disaggregated, volume, and unit costs). Moreover, costs can be evaluated through a monetary lens, such as the volume of use of services, financial performance, or productivity [17,18].

The three perspectives outlined above are interdependent, and the effect of pursuing one goal on another goal may be positive or negative [8]. In his description of the Iron Triangle, Kissick [21] argued that the three goals cannot be achieved simultaneously, and tradeoffs between costs and quality and/or access are inevitable in health care. However, Berwick et al [8] argued that the “[p]ursuit of the Triple Aim is an exercise in balance,” which should be considered in policy constraints. Unfortunately, according to Hendriks et al [17], the three dimensions of the Triple Aim are not evaluated simultaneously, and there are many heterogeneous measures in use; this prohibits comparison of the PHM initiatives. Berwick et al [8] claimed that finding a balance requires collaboration between partners and consideration of other factors besides medi-

cal determinants of health. Partners need to decide how much to spend on health care, as well as what coverage to provide and to whom [8]. Thus, achieving a balance between individuals and populations is probably a question of prioritization [18].

This article investigates the Triple Aim framework at the health policy (macro-) level because the goals of the Triple Aim are universal to all health systems, although the emphasis of the goals may differ between countries or jurisdictions (cf [5]). In the public policy literature, the macro-level is associated with the overall “politico-administrative system” [22] where the goals of the healthcare system are set and initiated [3]. These society-level goals are decomposed at the meso-level into more governable objectives or agendas.

There is an extensive body of academic literature on VBHC frameworks, which has been tested in different kinds of systems and contexts. The tests have focused on the impacts of care delivery and alternative payment models and used one or more of the Triple Aim perspectives at the level of operations [2,11]. However, the evidence of the effect of the VBHC movement on healthcare performance is ambivalent because of inconsistent results [2,14], potentially stemming from incomplete and simultaneous measurement of the achievement of the Triple Aim’s goals, the lack of a standard set of measures and domains [17,23], or a too-short time-frame from the implementation of the Triple Aim to its evaluation [14]. Two recent systematic literature reviews of the Triple Aim discussed its uses at the health system level, the consistency of its adoption [24], and its operationalization and application in primary care [23]. Mery et al [24] argued that jurisdictions define Triple Aim differently at the macro-level or globally, and Obucina et al [23] called for “stronger and more consistent measurement tools and definitions” to enhance the quality of comparisons and the clarity of the results concerning the impacts of the Triple Aim.

The research questions for the study are as follows:

1. How is the Triple Aim framework used for the performance assessment of health systems, and how is that assessment assumed to contribute to value-based healthcare strategies?
2. How does the prior health literature conceptualize and measure the concept of balance in the Triple Aim framework?

We explain our research methods and workflow below, then present and discuss the results of our descriptive and qualitative analyses. Finally, we draw conclusions.

## 2. Materials and methods

In this research, we used the five-step systematic review protocol of Denyer and Tranfields [25]. First, we formulated the research questions, determined the keywords, and determined the inclusion and exclusion criteria with a group of experts experienced in the field [25]. Then, we discussed the research questions, keywords, and inclusion criteria with a group of commentators in the fields of public accounting, administration, and management. We formulated the most relevant keywords—Triple Aim paired with impact or effect, balance, and healthcare management—to be aligned with the research questions. For the selection process, we generated a data extraction form to gather comments, decisions, key factors, and inclusion and exclusion criteria from the papers.

We searched databases for studies using key phrases and Boolean logic [25]. For the database selection and data search the author consulted library personnel trained in informatics. Based on the discussion with the library personnel, we selected the Scopus database, which combines several databases in the selected fields. We selected databases in the fields of health and social sciences, determined as the most relevant fields for the assessment of the impact of healthcare policies in Scopus. Most of the papers and

journals were from the field of health sciences (79.5%), particularly medicine; there were also papers from the social sciences.

We limited the search according to the language (English) and the timeframe (2008–2020). English is the predominantly used language used in scientific literature, and the phenomena in this research originate in the United States. We also wanted to avoid translation problems. Because the IHI established the Triple Aim in 2008, we set the timeframe from the beginning of 2008 to the search date [8]. We conducted the search on December 21, 2020. The number of articles on the Triple Aim increased each year until 2019. Specifically, after the enactment of PPACA in 2010, interest in and discussion of Triple Aim seems to have increased. The search strings and keywords used are listed in Appendix 1. The search outputs were downloaded into Refworks software (powered by ProQuest LLC), where duplicates were deleted.

We assessed the articles found as a result of the searches and documented our inclusion or exclusion of articles according to our predetermined criteria [25]. Two researchers, the author and a research assistant, independently selected articles and then read and codified them. The research assistant participated only partly in the selection phase and gave a second opinion when the author was pondering whether to exclude or include a paper. Our two researchers have a work history in the fields of healthcare administration and accounting, both in practice and research. The focus is on the results of the use of the Triple Aim framework for assessment at the health policy level, not the enabling factors or means to achieve the Triple Aim's goals. Thus, after we read the abstracts, we excluded papers on enabling factors, such as team-based care, new forms of education, development of performance measurement techniques, aims of developing population health, care coordination and clinical and technological innovations in delivering healthcare services [2]. The Triple Aim is tied to the Affordable Care Act (ACA), and the ACA initiated several programs to achieve the Triple Aim. However, our interest is not in how these different programs affected the healthcare system. We also excluded healthcare development programs initiated prior to the Triple Aim, such as many alternative payment models or earlier versions of Accountable Care Organizations (ACOs). Therefore, the inclusion criteria were that the paper evaluated the policy-level impact of value-based healthcare movements based on the Triple Aim goals, discussing at least one of the goals or the balance between the goals. Choosing papers evaluating only one perspective and not all three simultaneously may be problematic, but the number of papers finally selected would have dropped to nearly zero if we had not included these “one aim” papers. The selected papers usually expressed policy-level impact as a Triple Aim impact or an ACA impact; they also discussed system-level transformation to value (e.g., [2]) and integrated care (e.g., [13]). For clarity, we use the expression “Triple Aim impact” to refer to the impact of VBHC assessed with the Triple Aim. We codified the papers included by identifying whether Triple Aim principles were discussed in such papers and how they were discussed. Our paper selection process is presented in Fig. 1. After we read the abstracts, our selection criteria yielded 263 full papers, including articles, books, and seminar proceedings.

To describe the selected articles and the relations between them, as well as to develop knowledge that could not be understood by reading isolated studies, we analyzed and synthesized the data using both descriptive and qualitative synthesis [25]. We read and codified the full papers ( $n = 263$ ) and documented the following information on our extraction form (see Appendix 2):

1. Author(s), year of publication, journal
2. Federal level (national or regional) and country (context)
3. Reference type
4. Type of study

**Table 1**  
Articles selected by origin and federal level.

Origin	Federal level		Total
	National	Regional	
Canada		2 (100%)	2 (9,5%)
International	2 (100%)		2 (9,5%)
the US	11 (69%)	5 (31%)	16 (76,2%)
UK	1 (100%)		1 (4,8%)
Total	14	7	21

5. Population/subgroup/focus group
6. Aims of the study
7. Results evaluating Triple Aim impacts (yes/no) and
8. Key findings.

After reading the full papers, we selected 21 papers for the final analysis. We report and analyze the results in detail so that each reader can interpret them and evaluate the usefulness of our findings [25]. We applied the following steps to conduct this research:

1. Search for existing literature reviews from selected journals
2. Reformulation of the research questions, keywords for the search, and the selection criteria
3. Searches from the Scopus database with selected keywords using phrases and Boolean logic
4. Application of the selection criteria (excluding enabling factors, e.g., care models and education, and including Triple Aim impact or effect evaluation)
5. Selection of literature and coding and
6. Descriptive and qualitative analysis.

We present the results in the next section via both descriptive and qualitative data analysis.

### 3. Results

Our data analysis focused on the results of the 21 full papers. Our purpose was, first, to describe what kinds of papers were selected for the analysis, for which we used descriptive analysis. Second, we sought to answer the research questions—specifically, what kinds of results the selected papers provided about the use of the Triple Aim framework and the concept of balance between the goals of Triple Aim—for which we again used qualitative analysis.

#### 3.1. Descriptive analysis

We codified the final papers using the following categories: author(s), year, journal, federal level (national or regional), country, type of study, aims of the study, and key findings. We used the categories outlined below in the descriptive analysis.

Federal level and country: This category refers to the context of the publication/research. This category distinguished between the following (see Table 1): (i) the *national level*, referring to the central or country level; and (ii) the *regional level*, referring to the county or region and any other area smaller than the country. In the country category, papers with global implications and authors from diverse jurisdictions were classified as *international*.

Sixteen of the papers (76.2% of the total) were from the United States, two were from Canada, one was from the United Kingdom, and two were international papers from European countries. Fourteen papers in the analysis were based on the national-level perspective, the two papers from Canada discussed regional-level impacts, and five of the papers from the United States were based on the county or even smaller regional perspectives.

Type of study: This category refers to the research approach and data collection methods. We identified the six following categories

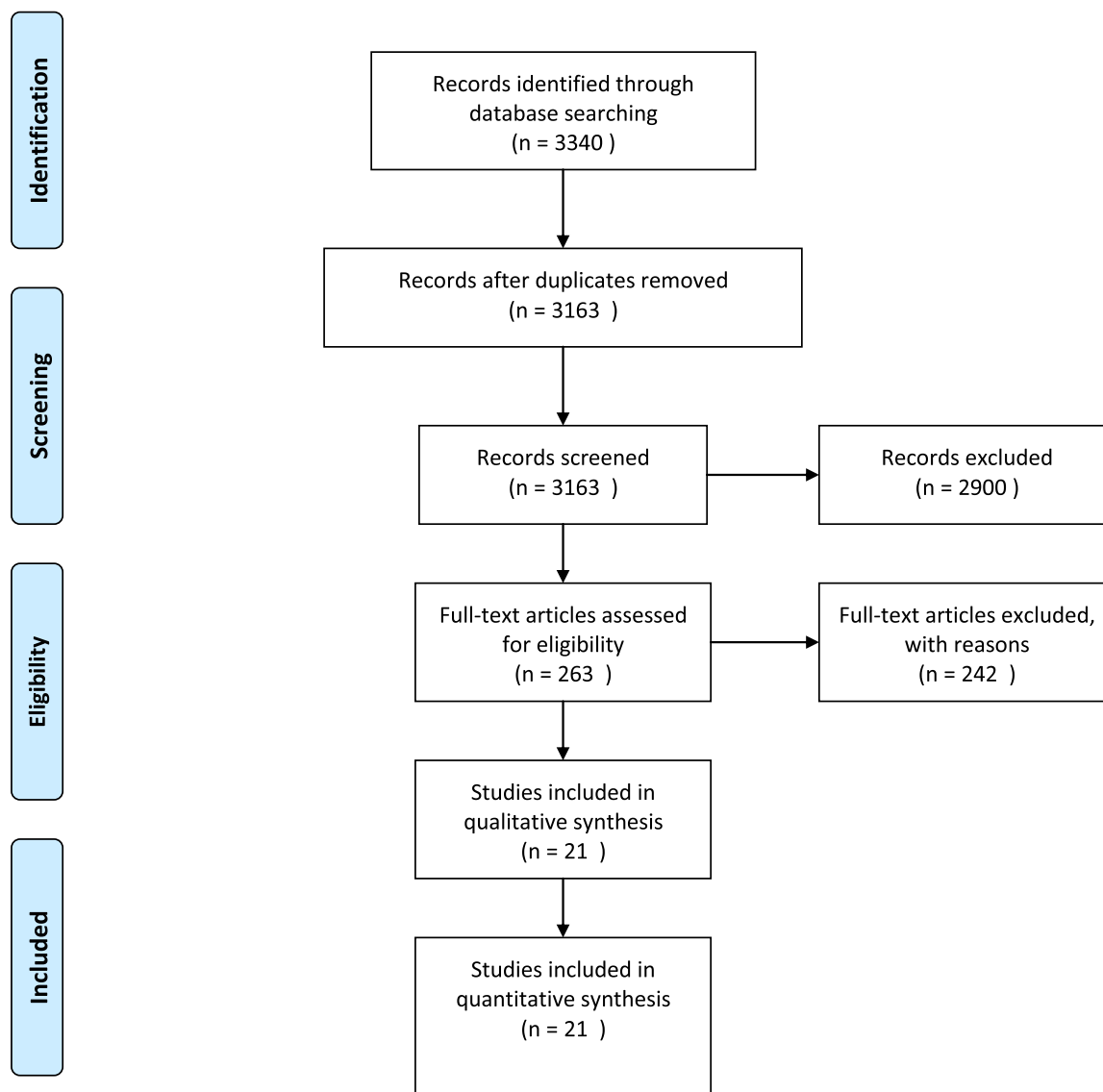


Fig. 1. Selection process [26].

Table 2  
Analysis of study types.

	absolute	relative
Data-based analysis	8	38%
Editorials/ Commentaries/ Symposia	5	24%
Case studies	3	14%
Literature reviews	3	14%
Mixed-method analysis	2	10%
Total	21	

(see Table 2): (i) *case studies*, referring to articles analyzing specific issues within the boundaries of a specific environment, situation, or organization using qualitative data collection methods (interviews and document analysis); (ii) *data-based analyses*, referring to papers often using statistical analysis of data gathered from official registries; (iii) *editorials/commentaries/symposia*, referring to papers expressing the editor's or author's opinion; (iv) *literature reviews*, referring to papers surveying relevant sources of a particular issue, area of research, or theory and providing descriptions and critical assessments of these works in relation to the research task studied; and (v) *mixed-method analyses*, referring to papers com-

binning both quantitative and qualitative methods of data collection and analysis.

The largest group of articles were data-based analyses (38% of the total). Five papers discussed the authors' opinions, three were case studies and literature reviews, and two were mixed-method analyses.

According to the inclusion criteria, the papers selected for the data analysis had to discuss at least one of the Triple Aim goals—namely, population health, patient experience, costs of care, or the balance between the goals Fig. 2. shows the distribution of the perspectives of the selected articles.

One-third of the articles ( $n = 7$ ) analyzed all three goals; 16 papers discussed population health (76% of the total), 13 papers analyzed the costs of care, and eight papers discussed patient experience. Balance was covered in six articles.

### 3.2. Qualitative analysis

The papers were categorized under two different criteria—those that analyzed the goal mentioned in the paper and those that analyzed the direction of the impact (positive, neutral, or negative). To describe the direction of the impact (cf Table 3.), the six following

**Table 3**  
Impacts in the selected articles.

Article	Population health	Patient experience	Costs of care
Gabbay RA and McGinley EL, 2014	↑	N.A.	↓
Keller D and Chamberlain LJ, 2014	↑	N.A.	↗
Proffit J, Wise PH, and Lee HC, 2014	↑	N.A.	N.A.
McCarthy M, 2015	↘	↘	↗
Whittington JW et al., 2015	↑	↑	↓
Erens B et al., 2017	↑	↑	↔
Haley SJ and Barnes J, 2017	↑	N.A.	N.A.
Mcgrail K and Ahuja M, 2017	N.A.	N.A.	↔
Pimentel L et al., 2017	↑	N.A.	↓
Robertson-Preidler J et al., 2017	AUS: ↑ UK: ↑ CH: ↘	AUS: ↑ UK: ↘ CH: ↑	AUS: ↗ UK: ↓ CH: ↗
Schmittiel JA et al., 2017	↑	↑	N.A.
Baxter S et al., 2018	UK: ↑ Internat: ↑	UK: ↑ Internat: ↑	UK: ↔ Internat: ↔
Burns LR and Pauly MV, 2018	↔	N.A.	↔
Jacobson PD, Parmet WE, 2018	↑	N.A.	N.A.
Ahn S, Hussein M, Mahmood A, Smith ML, 2020	N.A.	N.A.	↗
Sabounchi N, Sharareh N, Irshaidat F, Atav S, 2020	↑	N.A.	N.A.
Shaver AL, Cao Y, Noyes K, 2020	↑	↔	↓
Lapaine M, 2021	↑	↑	↓

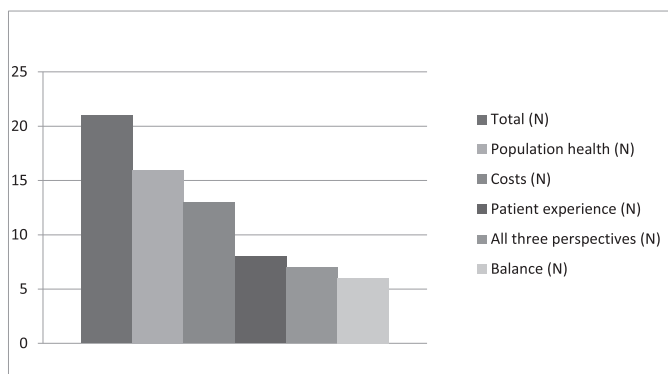
↔ = no impact, ↑ = increase in intended impact, ↓ = decrease in intended impact, ↗ = increase in unintended impact, ↘ = decrease in unintended impact, N.A. = not available

result categories were established: no impact (in blue), a decrease or increase in the intended impact (in green), a decrease or increase in the unintended impact (in red), and no information available. No impact means that the results of the paper analyzed provide no evidence on behalf of the expected outcome of the studied health policy program. Further, a decrease or increase means statistically significant results or otherwise proved impact according to the studied papers.

**3.2.1. Population health**

Population health was discussed in 16 articles. Most of them (n = 14) found positive impacts [10,13,19,27–37]. Positive impacts on population health were related to better insurance coverage of the health system after the ACA reform, which resulted

in improved access to care [27,29,30,32,33]. Negative unintended impacts were found in Robertson-Preidler et al [34], concerning Switzerland’s outcomes from the population health perspective. The authors argued that the more decentralized, region-based health system in Switzerland may create disparities in quality and outcomes and undermine equity. In addition, McCarthy [38] found a negative impact on population health and stated that people have suffered increasing difficulty in obtaining particular primary care services because of extended insurance coverage. By contrast, Burns and Pauly [2] argued that the transition to value has shown no evidence of an impact on the health system so far. Furthermore, the differences between the countries were discussed by Robertson-Preidler et al [34], whereas Baxter et al [13], found no differences between the UK and other countries.



**Fig. 2.** Systematic analysis of the literature discussing the Triple Aim goals and the balance between the goals.

### 3.2.2. Experience of care

Impacts on patient experience were found to be mainly positive in six articles, negative in two articles, and without an impact in one article. The positive impacts were specified as better integration and cooperation between healthcare services [13] and more personalized care and knowledge of where to go in case of illness [30]. Baxter et al [13]. found strong and consistent results between countries with respect to positive impacts on patient experience. However, McCarthy [40] and Robertson-Preidler et al [34]. found two distinctive mechanisms of unintended impacts on the patient experience. McCarthy [38] stated that the volume increase in insurance due to improved insurance coverage negatively affected patient experience and access to primary care. By contrast, in a case in England, Robertson-Preidler et al [34]. found limitations in individual choice due to the national prioritization of population health and equity in access. Shaver et al [37]. argued that the impacts on patient experience varied between the types of insurance and the patients' health status. There was no change in the patient experience of those with private insurance, but there was an improvement in the quality of the patient experience of those with public insurance and a deterioration for those with no insurance.

### 3.2.3. Costs of care

The impacts on costs of care were positive in six articles and negative in four articles, while in four articles no impact was detected. Cost reductions were reported in six articles [10,19,29,32,34,37], which was explained by a decrease in hospitalizations (e.g., [29]) and the progressive impact of the increase in resources for chronic disease care that led to cost savings (e.g., [32]). Keller and Chamberlain [27] claimed that the costs unexpectedly increased because the new delivery forms required investments in educating and delivering the services, and McCarthy [38] attributed the increase to better coverage, investments in new care and administrative models, and the overall growth of the economy [38]. Once again, Robertson-Preidler et al [34]. found differences between countries: Austria and Switzerland had higher costs of care due to greater patient choice and access to services, whereas the United Kingdom chose to prioritize cost-effectiveness over individual choice. The results of the study by Ahn et al [39]. showed that visits to hospital EDs increased after the ACA adoption (2014–2015), specifically by 4.3% points among 2+ multi-chronic conditions (MCCs) patients, whereas inpatient visits and inpatient nights (e.g., length of stay [LOS]) decreased marginally. The authors suggest that ACA's incentives to prevent hospital readmissions is a driver of these impacts because it encourages hospitals to “game the system” by holding more patients in the ED instead of admitting them as inpatients. Four articles found that the impact of the Triple Aim on healthcare costs or quality was weak or non-existent

[2,13,31,40], and McGrail and Ahuja [40] attributed this finding to the cost shift between hospitals and public nursing homes—that is, from public spending to out-of-pocket and private spending—because of decreased access to nursing homes or home care services. Moreover, informal care by family members or relatives was found to replace public services.

### 3.2.4. Balance

To answer our second research question, we evaluated how the concept of balance was described. Six of the selected articles focused on the question of balance [2,9,34,38,42,43]; of these, three discussed only balance [9,42,43], two included all three goals and balance [34,38], and the last one covered questions of costs and population health in addition to balance [2].

Four articles argued that a balance between the goals and simultaneous achievement of all three goals is not possible and that tradeoffs are inevitable [2,9,34,38]. McCarthy [38] stated that the tradeoffs would be between subpopulations and goals; Trosman et al [9]. found tradeoffs between cost and quality in cases of medical innovations; and Robertson-Preidler et al [34]. showed differences between countries. Burns and Pauly [2] argued that the Triple Aim would not lead to success because it entails a top-down national policy change; instead, they suggested that the change should be more gradual and occur in a bottom-up direction. In contrast, more recent articles by Roth et al [41]. and Shah et al [42]. supported the idea of balancing the three goals and achieving them simultaneously. Shah et al [42]. argued that higher costs of care are not necessarily associated with better outcomes, but better quality could lead to lower costs. Roth et al [41]. presented evidence of hospitals achieving high scores for all three goals. Both articles examined the circumstances behind this success. In addition, Shah et al [42]. found that a high number of surgeons and teaching hospitals was associated with better quality of care but lower costs. Standardized processes of care using evidence-based measures were associated with lower costs and reductions in both hospital LOS and complications. Moreover, complications had adverse impacts on all three goals. Roth et al [41]. stated that high bed utilization is positively associated with technical efficiency and negatively associated with clinical quality and patient experience, whereas physician employment is positively associated with all three goals.

## 4. Discussion

This review analyzes the uses of the Triple Aim framework and the results to assess health system performance. Furthermore, the article explores the concept of balance. The main findings are that there are differences in the evidence of the impact of value-based movement, and although it is a globally implemented concept, research on its impact at the health system level is insufficient. The scarcity of studies adopting a holistic view of the Triple Aim implies the difficulty of measuring performance using the Triple Aim framework [17,23] at the health system level. The Triple Aim targets simultaneous and balanced improvement of population health, patient experience, and cost of care [8]. The selected articles presented inconsistent impacts of pursuing the Triple Aim, which is consistent with previous literature [2,14]. Ultimately, the results of this study show a lack of consensus on the impact of each goal and on the concept of a balance between the goals.

According to the results, the value-based healthcare movement has had mainly positive impacts on population health and patient experience but more inconsistent results on cost of care. The population health perspective was covered in 16 out of 21 papers related to ACA reform and better insurance coverage in the United States. Real population health-related outcomes—that is, full functioning or quality of life—were used as measures in only a few pa-

pers [10,13,34]. Better insurance coverage leads to improved access to care but does not guarantee improvement in population health, so these results actually tell more about improvement in patients' experiences, than about population health. Patient experience was the least discussed, perhaps because this review was limited to considering policy-level papers. However, the results are promising from this perspective, stating that there are improvements in integration and cooperation as well in personalized care and knowledge sharing with the patients. Cost of care showed the most inconsistent results in the selected articles, possibly because of the lack of standardized measures in the Triple Aim framework [17,23]. The cost measures varied from total costs to costs of a project, patients' out-of-pocket costs, hospital bills, regionally gathered costs, and investment costs. Furthermore, in some cases, costs were measured as the rate of utilization of the ED or the rate of hospitalization. Decrease in cost was explained with shorter hospitalizations and cost savings in chronic care whereas, increase was attributed to the investment costs of new delivery forms, overall expansion of service coverage and choice of freedom. Gaming the system by transferring costs to other organization units or patients or even their family members was also pointed out in the papers. It seems that the specific measurement of cost of care requires standardization in order for effects to be discernible and comparable.

The initial objectives of pursuing the Triple Aim were to improve the health system as a whole [8] and to prevent zero-sum competition [6]. However, the selected articles mainly described one or two of the goals, and only one-third ( $n = 7$ ) of the papers discussed all three perspectives. Moreover, all three perspectives were evaluated along with the question of balance in only two articles [34,38]. Pursuing all three aims simultaneously is a paradox in the current market-oriented healthcare system in the United States, where growth of revenues seems to be a strong driver and the rational common interest is in conflict with the individual interests of physicians or organizations [2,8]. There is a lack of consensus about the possibilities of achieving balance, the means to achieve it, or even how to define and measure balance. Most researchers still speak about inevitable tradeoffs, which can be considered one alternative to achieving balance.

The selected articles published before 2020 argued for tradeoffs, stating that they are inevitable (e.g., [21]). However, the most recent research [41,42] provides evidence of success in finding a balance between the goals, meaning simultaneous improvements in performance from all three perspectives in these cases. Successes in the quality and cost of care are positively correlated in cases of high-volume surgeons, teaching hospitals, and standardized processes of care [42], and successes in all three goals are associated with physician employment [41]. However, the question of balance requires greater attention, and further research is needed to explore the mechanisms between the goals, the prioritization of the goals, and trade-offs between the subpopulations or actors involved. Nevertheless, McCarthy [38] found tradeoffs between subpopulations, and McGrail and Ahuja [40] found cost shifts between hospitals and public nursing homes, as well as between out-of-pocket costs and private spending and informal care. It seems that balance should be sought not only between the goals but also among the actors involved.

To conclude, the VBHC movement has widely accepted all three perspectives presented in the Triple Aim as core components measuring value. However, the measurement of such value seems to have two axioms—on the one hand, quality, and on the other, cost of care, measured at the micro- or meso-level. In the United States, the third aim—population health—was seen as involving better access to care or insurance coverage in this study. However, population health measures aim to capture the overall health of populations [24] and even consider factors of health other than medical ones [8]. Furthermore, the balance perspective in the equation

requires a standardized set of measures covering all viewpoints and an evaluation method that captures simultaneous views on performance at the health system level. The mixture of measures, contexts, levels of analysis, and populations in the same framework creates confusion and leaves unrealized the initial aims of improved population health, patient experience, and costs of care. Because of the differences between countries' health systems, there is no one-size-fits-all solution [24].

Successful implementation of the Triple Aim requires investments in performance management, specifically in recording the events, costs, and effectiveness of care, as well as the health of populations and the factors that affect the need for care and the analysis techniques (cf [18]). Berwick et al [8], suggested redesigning care services and structures population health management, establishing financial systems, and measuring performance at the macro-level in the United States to give incentives for implementing the Triple Aim. Since 2008, the Triple Aim has indeed led to healthcare reform innovations in the United States and globally (e.g., the introduction of ACOs, bundled payments, and other innovative financing approaches), new models of primary care (e.g., patient-centered medical homes), sanctions for avoidable events, and the integration of information technology [43]. However, a holistic view and evidence of improvements at the health system level are still lacking.

As a limitation of our study, although our research method was a systematic literature review, we acknowledge that the use of the Scopus database or the search strings we selected may have left some relevant literature unidentified. However, the number of search results ( $n = 3163$ ) ensured the stability of our conclusions. Second, limitation of this study is that most (76.2%) of the papers we reviewed discussed US-specific implications. In this sense, the generalizability of our findings is weak. Third, papers were excluded if they concentrated mostly on the impacts of regionally or locally implemented payment or care delivery programs aligned with the Triple Aim, rather than health system-level impacts. This narrows the scope of the study, and therefore we call for studies exploring the influence of these health policy programs in the future.

## 5. Conclusion

The VBHC movement has influenced the evolution of health systems, at least in the Western welfare context, and the Triple Aim framework has attracted increasing attention interest in the performance assessment of national-level health policies. This review adds to the literature pointing to a lack of evidence of the impacts on health system performance and inconsistency in the results of pursuing the Triple Aim at the health system level. More research is needed to fully comprehend the Triple Aim framework and how VBHC strategies can be measured. Moreover, this study supports the conclusion of earlier research that the measurement of the performance of the Triple Aim has been unstandardized, which may have affected the consistency of earlier results, thereby excluding comparison of populations (e.g., [17,23]).

This review contributes to the existing literature and future research agendas in two ways. First, it confirms the need for more research at the health system level to find the most suitable standardized measures for each Triple Aim perspective. How can we compare the performance of health systems without standardized measures? Second, it establishes the need for discussion of the meaning of the concept of balance and the significance of balancing the three Triple Aim goals at the health system level. Is this balance policy- and context-related, and does it always mean tradeoffs between the aims? Or does it remind us that success should not come at a cost to others but should be a compromise of the ideal model for all parties? To conclude, holistic use of the

Triple Aim concept with standardized sets of measures could improve the assessment of the value-based healthcare movement's effects and the comparison of health systems.

## Funding

This research is a part of research project Performance Measurement for Hybrid Governance funded by the [Academy of Finland](#) (grant number 326525).

## Biographical details

Mrs. Petra Kokko is a Development Manager at the Finnish Institute for Health and Welfare in Finland. She is a doctoral student in local public economics in Tampere University. Her thesis addresses hybrid governance in the context of healthcare and the paradigm shift towards value-based healthcare and its impacts on the health system at micro, meso and macro levels.

## Conflict of Interest statement

None.

## Acknowledgments

I want to thank the research group of Performance Measurement for Hybrid Governance -project for the cooperation and ideas in the development of the review and specially Taru Lehtonen (Helsinki University Hospital) for the collaboration during the article selection process.

## Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:[10.1016/j.healthpol.2022.02.005](https://doi.org/10.1016/j.healthpol.2022.02.005).

## References

- [1] Bonde M, Bossen C, Danholt P. Translating value-based health care: an experiment into healthcare governance and dialogical accountability. *Sociol Health Illn* 2018;40:1113–26.
- [2] Burns LR, Pauly MV. Transformation of the health care industry: curb your enthusiasm? *Milbank Q* 2018;96:57–109.
- [3] Kokko P, Kork A-A. Value-based healthcare logics and their implications for Nordic health policies. *Health Serv Manag Res* 2020;34:3–12. doi:10.1177/0951484820971457.
- [4] Marjouna Y, Bozic KJ. Brief history of quality movement in US healthcare. *CURRENT Rev Musculoskelet Med* 2012;5:265–73.
- [5] World Health Organization (WHO) The world health report 2000. health systems: improving performance. Geneva: World Health Organization; 2000.
- [6] Porter ME, Teisberg E. Redefining health care: creating value-based competition on results. Boston: Harvard Business School Publishing; 2006.
- [7] Porter ME. What is value in health care? *New England J Med* 2010;363:2477–81.
- [8] Berwick DM, Nolan TW, Whittington J. The triple aim: care, health and costs. The remaining barriers to integrated care are not technical; they are political. *Health Aff* 2008;27:759–69.
- [9] Trosman JR, Weldon CB, Douglas MP, Deverka PA, Watkins JB, Phillips KA. Decision making on medical innovations in a changing health care environment: insights from accountable care organizations and payers on personalized medicine and other technologies. *Value Health* 2017;20:40–6.
- [10] Whittington JW, Nolan K, Ninon L, Torres T. Pursuing the triple aim: the first 7 years. *Milbank Q* 2015;93:263–300.
- [11] Pimperl A, Schulte T, Muhlbacher A, Rosenmüller M, Busse R, Groene O, et al. Evaluating the impact of an accountable care organization on population health: the quasi-experimental design of the German Gesundes Kinzigtal. *Popul Health Manag* 2017;20:239–48.
- [12] National Health System Five year forward view. NHS; 2014. Available at <https://www.england.nhs.uk/wp-content/uploads/2014/10/5yfv-web.pdf> [accessed 15.10.18].
- [13] Baxter S, Johnson M, Chambers D, Sutton A, Goyder E, Booth A. The effects of integrated care: a systematic review of UK and international evidence. *BMC Health Serv Res* 2018;18:350–63 2018.
- [14] Perla RJ, Pham H, Gilfillan R, Berwick DM, Baron RJ, Lee P, et al. Government as innovation catalyst: lessons from the early center for medicare and medicaid innovations models. *Health Aff* 2018;37:213–21.
- [15] Merry AF, Shuker C, Hamblin R. Patient safety and the triple aim. *Internal Med J* 2017;47:1103–6.
- [16] Roy DA, Litvak E, Paccaud F. Implementing comprehensive population-accountable health networks in Quebec. *Healthcare Manag Forum* 2014;27:128–31.
- [17] Hendriks RJP, Drewes HW, Spreeuwenberg M, Ruwaard D, Struijs JN, Baan CA. Which Triple Aim related measures are being used to evaluate population management initiatives? An international comparative analysis. *Health Policy (New York)* 2016;120:471–85.
- [18] Struijs JN, Drewes HW, Heijink R, Baan CA. How to evaluate population management? Transforming the Care Continuum Alliance population health guide toward a broadly applicable analytical framework. *Health Policy (New York)* 2015;119:522–9.
- [19] Lapaine M. Embracing the quadruple aim: one hospital's experience. *Healthcare Manag Forum* 2021;34:26–8.
- [20] Stiefel M, Nolan K. A guide to measuring the triple aim: population health, experience of care, and per capita cost. IHI Innovation Series white paper, Cambridge, MA: Institute for Healthcare Improvement; 2012. Available at <http://www.IHI.org> [accessed 28.4.19].
- [21] Kissick W. Medicine's dilemmas: infinite needs versus finite resources. New Haven: Yale University Press; 1994.
- [22] Johanson J-E, Vakkuri J. Governing hybrid organisations. Oxon: Routledge; 2017.
- [23] Obucina M, Harris N, Fitzgerald JA, Chaia A, Radford K, Ross A, et al. The application of triple aim framework in the context of primary healthcare: a systematic literature review. *Health Policy (New York)* 2018;122:900–7.
- [24] Mery G, Majumder S, Brown A, Dobrow MJ. What do we mean when we talk about the Triple Aim? A systematic review of evolving definitions and adaptations of the framework at the health system level. *Health Policy (New York)* 2017;121:629–36.
- [25] Denyer D, Tranfield D. Producing a systematic review. In: The sage handbook of organizational research methods. Cornwall: MPG Books Group; 2011. p. 671–89.
- [26] Moher D, Liberati A, Tetzlaff J, Altman DG, Group The PRISMA. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *PLoS Med* 2009;6:e1000097. doi:10.1371/journal.pmed1000097.
- [27] Keller D, Chamberlain LJ. Children and the patient protection and affordable care act: opportunities and challenges in an evolving system. *Acad Pediatrics* 2014;14:225–33.
- [28] Haley SJ, Barnes J. New York community health centers' population health activities: findings from a statewide assessment. *J Health Care Poor Underserve* 2017;28:677–93.
- [29] Pimentel L, Anderson D, Golden B, Wasil E, Barrueto F, Hirshon JM. Impact of health policy changes on emergency medicine in Maryland stratified by socioeconomic status. *West J Emerg Med* 2017;18:356–65.
- [30] Schmittiel JA, Barrow JC, Wiley D, Ma L, Sam D, Chau CV, et al. Improvements in access and care through the affordable care act. *Am J Manag Care* 2018;23:e95–7.
- [31] Erens B, Wistow G, Mounier-Jack S, Douglas N, Manacorda T, Durand MA, et al. Early findings from the evaluation of the integrated care and support pioneers in England. *J Integ Care* 2017;25:137–49.
- [32] Gabbay RA, McGinley EL. The affordable care act, technology, and type 1 diabetes mellitus. *Diabetes Technol Ther* 2014;16:819–21.
- [33] Profit J, Wise PH, Lee HC. Consequences of the affordable care act for sick newborns. *Pediatrics* 2014;134:e1284–6.
- [34] Robertson-Preidler J, Anstey M, Biller-Andorno N, Norrish A. Approaches to appropriate care delivery from a policy perspective: a case study of Australia, England and Switzerland. *Health Policy (New York)* 2017;121:770–7.
- [35] Jacobson PE, Parmet WE. Public health and health care: integration, disintegration or eclipse. *J Law Med Ethics* 2018;46:940–51.
- [36] Sabounchi N, Sharareh N, Irshaidat F, Atav S. Spatial dynamics of access to primary care for the Medicaid population. *Health Syst* 2020;9:65–75.
- [37] Shaver A, Cao Y, Noyes K. General health care utilization among nonelderly cancer survivors before and after affordable care act implementation: early results. *JCO Oncol Pract* 2020;16:e581–9.
- [38] McCarthy M. ACA and the triple aim: musings of a health care actuary. *Benefits Q* 2015;31:39–42.
- [39] Ahn S, Hussein M, Mahmood A, Smith ML. Emergency department and inpatient utilization among U.S. older adults with multiple chronic conditions: a post-reform update. *BMC Health Serv Res* 2020;20:77–87.
- [40] McGrail K, Ahuja M. What is bending the cost curve? An exploration of possible drivers and unintended consequences. *Health Policy (New York)* 2017;13:20–30.
- [41] Roth A, Tucker AL, Venkataraman S, Chilingirian J. Being on the productivity frontier: identifying "Triple Aim performance" hospitals. *Prod Oper Man* 2019;28:2165–83.
- [42] Shah R, Diaz A, Tripepi M, Bagante F, Tsilimigras DI, Machairas N, et al. Quality versus costs related to gastrointestinal surgery: disentangling the value proposition. *J Gastrointest Surg* 2020;24:2874–83.
- [43] IHI organization; 2018. Available at: <http://www.ihl.org/Topics/TripleAim/Pages/default.aspx> [accessed 11.7.18].