HEALTHCARE LOGISTICS:
AN INTEGRAL, PROCESS-ORIENTED APPROACH

Abstract

The healthcare industry is in full swing. Pressure on the industry increases as a result of social, economic and financial developments. An aging population, increase in care demand, high costs and higher demands on customer value are significant aspects in this. One of the ways of dealing with this, in the Netherlands as well as in Poland, is to organize healthcare processes more efficiently in combination with a more empathetic focus on the customer. Healthcare Logistics stands for an integral approach of the design of healthcare processes, in order to make a contribution to the optimizing of customer value, cost control and savings in the healthcare. Lean and process management focus mainly on designing healthcare processes as efficient as possible where appointments with the customer of those processes are the principle. The logistic contribution counts mainly for tuning the required and available capacity. For the development and putting into practice of integral and customer oriented process management there are several models and tools available, which are deployed in conjunction with each other. Hence the article is focused on integral process oriented approach of healthcare logistics.

Keywords: Healthcare Logistics, Lean, process management

Introduction

The healthcare sector in the Netherlands is in full swing and faces big challenges. Developments on the side of the healthcare demand as well as on the side of the healthcare offer demand a transition in the way of thinking about
the organization of the healthcare offer. Traditional thinking in 1st, 2nd and 3rd line-healthcare paves the way for an integral approach of and cooperation in the entire healthcare chain. The government’s role and (along with that) the financing of healthcare change. Both from substantive healthcare as from organizational arguments the role of the healthcare demander, the customer, client or patient changes from dependent to independent and directing. As a result of these developments organizations reposition themselves, new offers and providers emerge, healthcare concepts change and healthcare providers focus on costs control and saving. Also views considering organization design change firmly. They move from a task and function oriented approach in, traditionally, hierarchically organized environments to a process oriented organization design, in which the importance of the patient and smart designs of processes are on the front. Self-control makes its entry. In Poland, the healthcare sector is also in full swing, though from an entirely different basis. Here, costs control and saving also make an important contribution to a healthier sector (MZ, 2017; PWC, 2017).

Hence, this article follows the way in which, given the turbulent healthcare context, an integral process oriented approach can make a contribution to an important aspect of the developments: organizing healthcare more efficiently or more precise, designing healthcare processes more effectively, where the result is a healthier balance between healthcare costs and results. Staff and treatment costs generate a large chunk of the healthcare costs, thus a focus on deploying people and tools more efficiently is an important priority.

The outlined principle, developments, methods, theories and models determine the purpose of the article, which is a development of an integral process oriented approach at the turbulent healthcare logistics. To meet this aim two main research methods are used. First of them is a literature review, which identifies the ‘state of the art’ – perceptions about healthcare logistics. The literature results are verified by one of the Authors (Peter Maas Geesteranus) experience, which was gathered during the past decade in the higher vocational education in the Netherlands. Subsequently the following issues are discussed:

- healthcare logistics:
  a) definitions, principles and defining,
  b) strategy, focus, management levels,
  c) integral approach organisation-design of healthcare processes;
- primary processes as principle for organization design:
  a) tuning demand and offer,
  b) the healthcare demand defined: customer and result,
  c) healthcare offer: process optimalisation.

Based on the theory and Author (Peter Maas Geesteranus) vocational experience, the integral an integral process oriented approach at the turbulent healthcare logistics is formulated at the form of a MoVer-model of healthcare logistics.
1. Conception of healthcare logistics

The developments in society and healthcare sector require a reorientation on customer oriented healthcare as a result of a process and (therefore) more integral and thorough knowledge and insight on business administration processes. Healthcare organizations are traditionally predominantly activity and capacity oriented. The future demands a fundamentally different vision on the design of healthcare: customer oriented and process driven. One of a critical element of effective and efficient functioning of healthcare organizations is logistics. Healthcare logistics concerns all activities that are related to the development and execution of a vision and the policy regarding the design of healthcare processes in the broad healthcare sector, with specific attention to the logistic aspects of it, in conjunction with the total business management, as well as the realization of it in healthcare organizations. Healthcare logistic management makes important contributions to making and keeping qualitative good healthcare and assistance affordable. Hence the quality of healthcare is the key performance driver for all the logistics activities at the healthcare organizations, and is defined as the extent to which the healthcare offer is tailored to the wishes of the client/patient, who, to a greater or lesser extent, wish to have influence on:

- the form and content in which the healthcare is offered;
- the person that executes the healthcare;
- the place, where the healthcare is offered;
- the moment (day and time), where the healthcare is offered (Moeke, Verkooijen, 2013).

On the other side, mainly from the economic efficiency point of view, there is a strong correlation between the level of quality and costs. This fact in healthcare practice put on logistics management a task to find optimum by a careful balancing with the bundle of offered healthcare services as a result of the desires and preferences of the client/patient with the consideration of a responsible commitment of and needed resources, which usage is reflected by cost category (costs) at the form of:

- the financial space of the indication and/or the own pocket,
- the professional responsibility of the healthcare and assistance,
- the organizational responsibility of the provider,
- generally accepted values and standards.

In addition, the practical balancing between these two contradictory categories of quality and cost are performed under the continuous changing environmental factors, mainly state or local government financing circumstances, national healthcare regulations, focus on positive financial result etc. The understanding of healthcare quality in connection with costs control allows to define the healthcare logistic management as “Controlling the treatment-/healthcare-/support processes and the related deployment of means (professionals/equipments), the information and flow of goods, in such a way that the desires of the client/patient are met where the possible costs are as favorable as possible” (Moeke, Verkooijen, 2013). In addition to the above definition it should be added, that in the healthcare there
is a distinction between primary, supporting and supplying processes. Increasingly and especially during the last decade, the logistic profession stands in the interest of healthcare organizations as a significant instrument to improve the relation between the costs and quality. In business, logistic is a control instrument of the flow of goods in the track of supplier to client. The characteristic of the primary process in the healthcare sector is in it, that the healthcare process is a service, what means that raw materials, products and customer are united during the performance of the healthcare service at the time and space. Thus, the effective and efficient management of the primary and supporting processes is a specialty of the healthcare industry.

In the last years much attention has been paid to the introduction of process management in the healthcare sector, including logistics, what has been also reflected at the literature. Landry and Philippe (2004) underline the increasing role of logistics activities for healthcare organizations, especially for the improvement of service quality and keeping expenditures on the acceptable level. According to these Authors (Landry, Philippe, 2004, pp. 25, 29), up to 46% of a hospital’s total operating budget is spent on logistics related activities, what cause a shift from a limited role of no strategic value to a more proactive role, where logistics provides credible and significant support to the healthcare organization. A continuation of the thesis can be found at the article of Aronsson, Abrahamsson and Spens (2011). These Authors formulate a conception of supply chain orientation (SCO) for the health services sector, reflected above all at a hybrid strategy, which combines lean and agile supply process resulting in flexible adjustment to the patients. There can also be found some case studies at the literature. One of them regards a case at North Mississippi Health Services (Jin, Switzer, Agirbas, 2008), which was scored according to four parameters (fill rate, accuracy rate, efficiency and expiration/spoilage rate) and an improvement project, applying Six Sigma and Lean Thinking principles, was elaborated to enhance the offered level of health care services. An overview of the other cases is presented at the article of T aner, Sezen and Anthony (2007). The above mentioned literature supported by practical observations allow to draw some remarks, namely that a distinction is made between managing healthcare units and managing healthcare processes. In the healthcare unit the aim is to optimize deployment of the available capacity of resources (professionals and equipment). The goal of the management of the healthcare process is to optimize the lead time of the patient. Logistically, these approaches are designated as respectively push and pull strategy in terms of management practice. Pure unit management leads to unacceptable waiting and lead times, and approach, which is solely oriented towards process management, leads to low occupancy rates and therefore too high costs. A tuned and integral deployment of process as well as a unit management leads to an optimal situation or the balance between flow of the patient (quality) and occupancy rate of the capacity (costs).

Shifting into the integrality conception, it can be said that such terms as comprehensive, or interrelated are short definitions of it. With that, an ambitious as well as important and even conditional principle is formulated. Identification of the customer and his desires and the thereon tuned integral business
management are the two core elements of the vision on healthcare logistics. At integral business management there is a balanced attention to the following three fields: strategy-design-management. In this article the focus lies on infrastructure based on strategy (Veen, 2013), what is presented at the Figure 1. Not unimportant is the last aspect of integral business management: leadership, responsibility, ownership, summarized in the concept’s culture and behavior.

As argued before, the shift from ‘action/task/function oriented work’ to ‘process driven’ makes for a very important challenge in the organization of the healthcare sector the coming decade. Process management requires an integral approach: in the primary chain as well as in the supplying and supporting processes. Integral business management occurs on four axes and in mutual interrelationship between those axes (Figure 2):

- vertical integration: management (strategic, tactic, operational), leading and leadership;
- horizontal integration: supply chain management, which tunes activities in the primary healthcare process within organizations and in the entire healthcare chain (1st line: reference, 2nd line: treatment, 3rd line: aftercare);
- process integration, which tunes primary and miscellaneous processes (secondary, supporting, supplying, etc.);
- organizational integration, which regards business administration, tuning of all policy areas in service to the primary process.

Figure 1. Implementation fields
Source: (Veen, 2013)
In relation to vertical integration, it gives response to the question how are decisions on strategic, tactical, operational level regarding design of the organization and (improvement of) business management made in conjunction with each other, in such a way that it complies with the integral arrangements concerning costs and quality? The relation between the management levels are filled by having the PDCA cycle of management and responsibility connection on diverse levels, what is presented at the Figure 3 and 4. The value strategies model of Treacy and Wiersema (1995) is meant to develop company strategies (Figure 5). To the benefit of the healthcare sector, the model helps gaining insight on the translation of the mission of the organization in concrete statements about the organization as a whole, or for its components in strategy, policy and objectives. Thereby, choices are made in conjunction, but independent from the context, for profiling on the following areas:
- expertise: healthcare expertise, means;
- affordability: operational excellence, smart organizing;
- customer orientation: focus on customer, self-reliance, direction over own life and healthcare.

The choice on strategic level can be translated to more concrete objectives on these three areas on tactical level, which are helpful when it comes to designing the process, and also the operational level for the benefit of the process management and responsibility.

In relation to the horizontal integration in supply chain management, it gives an answer to the question how is the healthcare process during the entire healthcare chain (= creation of healthcare demand till its solving) organized in such a way, that the arrangements regarding costs and quality are met? Integral process management plays a role in here. Decisions are taken in mutual cohesion between the links (activities/units) in the entire chain wherein all of them are responsible for the whole, from which the performance of every link is derived.
Figure 3. Management Levels
Source: (own elaboration)

Figure 4. Management cycle PDCA
Source: (own elaboration based on Deming cycle)

Figure 5. Value strategies
Source: (Treacy, Wiersema, 1995)
In relation to the process integration, it gives an answer to the question how are the primary and the miscellaneous processes integrated, in such a way that the primary process is facilitated, and that, as a result, the integral arrangements regarding the costs and quality are met? The relation between primary and supplying/supporting processes is a customer/supplier relation, wherein services are made based on arrangements made in advance regarding quality/service level/KPI’s (Service-Level-Agreement). The primary (healthcare) process is the customer servicing process, which stands for the ‘heartbeat’ of the organization, determines the secondary processes, including logistics one, which supply the first one at all the resources needed.

Finally, in relation to the organizational integration (business administration) aspect of integral business management, it gives an answer to the question how are decisions with regard to all company aspects taken in such a coherent manner, that the integral arrangements regarding costs and quality are met? These aspects concern among others finances, business economy, communication, HRM, safety, quality policy, etc.

2. Primary processes as a basis for organization design

To obtain insight on the cohesion in processes, a model has been developed, where all aspects are addressed. This is where the relation customer-result-process becomes clear. The integral approach is an elaboration of the infrastructure aspect (Veen, 2013). The tuning between the healthcare demand and healthcare offer is derived from the cohesion between both of these, which includes the vision on:

- the developments from the demand side, existing from the customer typing and the demanded/expected/agreed resultant of the healthcare process;
- the offer side as designing the healthcare process in such a way that it leads to the desired results.

A very effective way to analyze and (re)design healthcare processes is lean. Lean lays an excellent link between demand and offer. The lean philosophy states that “The core idea is to maximize customer value while minimizing waste. Simply, lean means creating more value for customers with fewer resources” (Lean, 2017). Here, the balance between the desires of the customer on one side, and the customer-service as delivered by the process on the other side, is central as shown in Figure 6.

Subsequently the three main aspects of the customer-result-process are discussed. First of them touches the problem of how do we specify customer (in various customer-supplier relations), where the end customer is the healthcare demander. At this aspect three processes can be identified:

- primary process: healthcare demander to type (diagnose) + healthcare demand (volume-variability-predictability);
- subprocess: customer is the owner of the following subprocess (step/healthcare activity);
- supporting/supplying process: primary process is owned by a customer.
Results are to specify in (agreed) profits:
- substantively: which healthcare desired/required (form, content, person, place), diagnose, substantively, relational;
- organizational: point of time (delivery time, waiting time), extent, flexibility, costs.

The above course of reasoning leads to the thesis that the healthcare demand generates the profits for the healthcare process. The healthcare offer (the healthcare process) ideally consists of logically successive process steps, where the principle is that each step (act 1-2-3-...) gives added value to the agreed process result and thus the customer. The healthcare offer consists of three main aspects: process steps/activities, capacities (people and means), management.

With analyzing, diverse analysis instruments are utilized in mutual cohesion. At the Figure 7, the most important means for the health-care process improvement are displayed.
3. Instruments for process-description, design and improvement

The Integral Logistic Concept (Visser, Goor, 1994) offers an excellent systematic in order to map the business management. It raises mission/vision/strategy/(logistic) policy objectives and organization (process) design in mutual cohesion. It aids in identifying shortages, which is an important requirement for the process improvement.

Comparable to the ILC is the MoVer-model (Moeke, 2016). Its cooperation is the same as the ILC, however with more and specific attention to the customer perspective. The model is shown in Figure 9.
In the lower part of the MoV er-model the aspects of logistics design are mentioned. One important aspect is tuning demand and offer from the perspective of capacity management. The natural variation in arrival of patients (volume, variability) as well as the artificial variability from the offer side require some flexibility in waiting times from the demand side and the occupancy rate of the capacity from the offer side (Figure 10).

Shifting to the lean as a philosophy and instrument in order to work smarter, it should be noticed it is popular in the healthcare sector. The focus here is on integral philosophy, more than the solely operational (local) health-care logistics process improvements. Lean is aimed at the process optimizing in the following steps:
1) identify the customer (diagnose(group), volume, variability);
2) identify the service/product (type, place, time, person) to be delivered;
3) describe the current process (ILC/MoVer);
4) value the process on the basis of added value (value stream mapping, wastes);
5) recreate the process;
6) implement the new situation (logistic change management).

In step 4 (more operational) lean aspects appear, such as: value stream mapping, removal of waste.

Lean knows eight wastes and aims to stabilize processes. The philosophy assumes the delivery of added value and the instruments aid in identifying the added value. Figure 11 shows the positions of lean in relation to other improvement tools and methods.
Figure 11. Lean in relation to other improvement methods
Source: (Global, 2017)

Conclusion

Integral management on healthcare processes, lean management, continuous improvement and the leadership and self-control, which are equipped thereon, are success factors in a shift to customer oriented healthcare and costs control and saving. The key healthcare concept is integral process management. From the lean philosophy, processes are designed on enlarging the customer value. There are various models and instruments available in order to reach that, including the Mover-model, the Integral Logistic Concept, Value Stream mapping, removal of wastes and continuous improvement. Applied properly and in cohesion it leads to a process oriented design with, as a result, costs control and saving in combination with greater customer value at the healthcare sector. Partly under influence of financial and organizational pressure on the sector, a shift to a more facilitating leadership takes place, and with that to a different professional attitude and behavioral skills of the staff. Self-control where ownership and responsibility are of importance becomes more significant. It is interesting to research how this should look like and how this can be developed, in order to successfully make the shift in ‘organization thinking’ of function and task oriented to process driven. This aspect falls outside the scope of this article, but is of great significance within the framework of the integral approach, because behavior, change preparedness are requirements for the continuous improvement of the healthcare process.
Healthcare logistics: an integral, process-oriented approach

References
Van der Veen, J. (2013), De kracht van Ketensamenwerking (Waarom kennis en kunde in Supply Chain Management de Logistiek gaan verbeteren); inaugural address, EVO-chair Supply Chain Management, Nijenrode-University, pp. 12–13.

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