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Standardisation of Supporting Processes in Healthcare *A case study of the APQC Healthcare Process Classification Framework*

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Abstract

Every patient is unique. This is why hospitals are characterised by highly complex and variable processes. We distinguish between two main categories of processes: The primary healthcare process concerned with the cure and care for the patient, and supporting processes such as logistics, planning, and administration. The American Productivity and Quality Center Healthcare Process Classification Framework (APQC-HPCF) is an open standard designed to support the standardisation of supporting processes in healthcare. In this paper, we perform case studies at two of the hospital's clinics. Through observations, interviews, and analysis of process descriptions, we establish to which extent the processes described by APQC-HPCF are implemented in practice. This is done to both identify differences between the clinics' supporting processes as well as to validate the efficacy of the APQC-HPCF, which has not been previously tested in scientific literature. Results show that the clinics perform nearly all of the prescribed processes. Deviation from the APQC-HPCF is mainly explained by the fact that some of its contents are designed for the American market and do not apply in the Dutch market. The clinics perform some additional supporting processes that are not present in the framework. Also, minor differences in supporting processes between the two clinics were found. The results show that the efficacy of the APQC-HPCF is validated by a large extent but cannot be proven completely.

Keywords: Healthcare, hospital, process management, quality management, process framework, process standardisation

1 Introduction

Hospitals have complex processes and organisational structures and operate within a demanding environment. The ageing population requires more long-term care, financial resources are strained, and the government, insurers and accreditation bodies demand stricter quality control and more transparency. In the global market, we see hospitals responding to these challenges by introducing standardisation efforts in order to achieve more efficient process management. Process management entails both the primary processes (cure and care) as well as supporting processes (logistics, planning, administration, etc.). A process is considered a set of activities that create value. In the case of hospitals, the focus is on creating value for the patient through curing and caring activities. In practice, hospitals may focus on one of many different factors, such as cost reduction, patient satisfaction, enforcing safety regulations, et cetera, in an effort to improve efficiency. The central goal should be the creation of value, defined in literature as 'the health outcomes for the patient relative to the costs incurred' (Porter, 2010). By improving the quality of processes, we enable value creation.

In this study, we focus on the standardisation of supporting processes. The hospital in which our study is performed has previously introduced a process management framework for the primary care process. This hospital is a mid-size (around 400 beds), public, and regional hospital in The Netherlands. Now, it is looking to complement the primary process by also standardising supporting processes. The hospital currently has little insight into how its supporting processes are performed. However, supporting processes are instrumental in ensuring the desired execution of the primary process. We define supporting processes as: "Processes that contribute to and enable the execution of the primary healthcare process, through activities such as patient scheduling, materials planning and administration."

The American Productivity and Quality Center (APQC) provides open, standardised frameworks for processes. These include the Healthcare Process Classification Framework (HPCF). The APQC-HPCF is one of the few frameworks aimed specifically at the healthcare sector. In this study we compare a number of process frameworks to ensure that APQC-HPCF provides the best fit for the goal of standardising supporting processes. The efficacy of the APQC-HPCF is not yet proven in scientific literature and it has not previously seen implementation in Dutch hospitals. Therefore our study attempts to map the contents of APQC-HPCF onto the supporting processes performed in practice at two of the hospital's clinics. By performing observations, interviews, and by analysing process descriptions, we map the contents of APQC-HPCF onto the situation found in practice.

The study is performed in collaboration with the quality management department of the hospital. This department desires clear, structured processes and process descriptions. Two outpatient clinics were selected for performing the study. An outpatient clinic provides services to patients who do not stay overnight (as opposed to an inpatient clinic). The services provided include the examination and treatment of patients. The urology clinic and the obstetrics & gynaecology clinic were selected due to their willingness to participate in this study. By mapping the APQC-HPCF onto the working methods performed in these clinics, we attempt to identify and explain differences between the model and practice. This will give insight into the efficacy

of the model in regards to standardising supporting processes and thereby improving the quality and value of healthcare.

The main research question for this study is defined as follows:

RQ: “To what extent can the efficacy of the APQC-HPCF model be proven in terms of quality improvement in standardising supporting processes?”

The following section describes a literature review on the dynamics of the healthcare market, the need for process standardisation, and a comparison of process frameworks. Section three describes the research approach. The results are presented in section four, by providing process descriptions as well as a matching of the supporting tasks and activities with APQC-HPCF. Finally we provide the conclusion and discussion of this study.

2 Literature Review

Healthcare expenditure in The Netherlands is relatively high, with 15.6% of the GDP spent on healthcare (Centraal Bureau Statistiek [CBS], 2014b). A yearly increase of 11.21% per capita healthcare expenditure was seen between 2001 and 2011 (Bloomberg, 2013). The National Institute for Health and the Environment (2014) states that volume growth is the main instigator of cost increase. Bloomberg (2014) compares efficiency of national healthcare systems based on life expectancy and per capita cost of healthcare (relative and absolute). Between 2013 and 2014, the Dutch healthcare system fell from 25th to 40th place. This indicates a decline in efficiency.

Previously collected data from over a thousand organisations in different sectors shows that the Dutch healthcare and public sector score lowest in terms of process management maturity when compared to other sectors (Luyckx, 2012). There is a large difference between the lowest-scoring healthcare sector and the highest-scoring financial and automotive sectors. Luyckx (2010) identifies that hospitals are complex organisations that need to align their processes externally with other organisations (general practitioners, insurance companies) as well internally, between departments. Rising costs and increased demand for healthcare, as well as efficiency obstacles, suggest the need for the improvement of process performance.

The complexity of process management in hospitals lies in its large variety of medical specialisations (Mans, Schonenberg, Song, van der Aalst, & Bakker, 2009). The variety of specializations and therapies increases, while patients demand higher quality services and shorter waiting times (Øvretveit, 2000). Patients may require the care of different medical specialists throughout their care process. This is also called the care pathway. A patient’s care pathway can be highly variable and runs through different hospital departments. The complexities of healthcare processes introduce a risk of errors and unnecessary waiting times. Patients with the same diagnosis may encounter different waiting times in their process and the reasons for this are not always known (Mans et al., 2009).

Standardising healthcare processes contributes towards better process performance, by reducing costs and improving patient outcomes. For example, A study performed by Rozich et al. (2004) shows that the introduction of a standardised protocol for insulin administration for

diabetes patients lead to a reduction in hypoglycemic episodes from 2,95% to 1.1% over a period of 30 months. Medication errors decreased significantly with 213 errors per 100 admissions to fewer than 50 errors per 100 admissions. Arora & Johnson (2006) identified and standardised the patient hand-off process concerned with care transitions. This process occurs when patients transfer from one department to another or when a shift change occurs. The hand-off process is critical to patient safety, as inadequate communication of patient information in care transitions may lead to the unintentional discontinuation of essential medication (Bell et al., 2011). Reduction of errors and improving task and information hand-off are just a few examples of how patient outcomes are improved while avoiding the likelihood of costly incidents. Rozich et al. (2004) posit that standardisation of processes lead to reduced complexity, increased safety and possible cost savings. They recommend similar efforts to be taken in other clinical areas.

Based on literature studied in this section, we conclude that there is a desire for quality improvement in hospitals due to their internal and external dynamics. Standardisation of processes will help to realise greater coherence, reduced risk for errors and improved transparency. Hereby, the quality of processes can be improved. The following section explores available frameworks for process standardisation and substantiates the selection of the APQC-HPCF for standardising supporting processes in our case study.

2.1 APQC-HPCF and other process frameworks

The APQC Healthcare Process Classification Framework provides insight into business processes in a systemic manner, with a hierarchical structure (APQC, 2014). The Process Classification Framework (PCF) is an open standard to realise improvement of process management and benchmarking, regardless of type industry, size and geographic location of organizations, with offshoots provided for specific sectors such as healthcare. At the time of writing, no scientific literature was found in regards to testing the APQC-HPCF in practice. The consequence is that the APQC-HPCF is not scientifically proven and do not guarantee to achieve standardization within organizations. In this section, we describe the general layout of the framework and compare it with a set of other process standardisation frameworks.

There are two methods for organisations to adopt the process framework. The first method is full adoption, where changes are made in the organisations structure in order to achieve the structure as prescribed by APQC-HPCF. The second method is the custom interlayer adoption, where the process framework is adopted with only partial changes to the organisation (APQC, 2016). APQC-HPCF is divided in the following five levels (APQC, 2014):

1. Category
2. Process Group
3. Process (focus within this case study)
4. Activity
5. Task

The focus within this case study will be at level three, the process. Processes are a series of interrelated activities that convert inputs into results (output). As indicated in the introduction of this paper, the focus of our study on supporting processes. We defined supporting processes contribute to and enable the execution of the primary process. The first two levels of the APQC-

HPCF take a more abstract look at organisational processes, while the last two levels go into more specific detail. At this point, level three (process) was deemed most relevant by the quality management department, with a balance between abstraction and simplicity.

Level three of the APQC-HPCF, the process level, contains operational business processes and management and support services. These are subdivided into twelve categories. Because our scope is limited to supporting processes, we only focus on the related categories. These are category 4.0 'Deliver Products and Services' and category 5.0 'Manage Customer Services'. The fifteen supporting processes within these two categories are shown in the Table 1 below.

4.0 Deliver Product and Services	
4.2.2	Manage demand for materials
4.2.3	Create materials plan
4.5.1	Update medical records
4.5.2	Review completeness of medical records
4.5.3	Submit and respond to information queries
4.6.1	Schedule the patient
4.6.2	Verify insurance
4.6.3	Register the patient
4.7.2	Manage throughput and schedule resources
4.8.1	Provide patient with discharge instructions, care education, and orders
4.8.2	Solicit discharge paper signature from patient
4.8.3	Coordinate post-discharge services
4.8.4	Release patient
5.0 Manage Customer Services	
5.3.1	Plan and manage customer service work force
5.3.2	Manage customer service requests/inquiries

Table 1 Supporting processes of APQC-HPCF

There are different ways to identify and standardize business processes of healthcare organizations. During the literature study, information was collected on different existing process frameworks. These are compared and classified according to their goal, function and characteristics in Table 2.

	Goal	Function	Characteristics
EFQM model (EFQM, 2015)	Control, stabilize, standardize with a fixed order	A tool to determine a target and bring several areas clear through mapping	<ul style="list-style-type: none"> - Nine focus areas - Not specific for healthcare organizations - No framework
NICTIZ Hospital Domain Reference Model (NICTIZ, 2016)	Support hospitals with the organization of information technology	Reference overview of the relationship between business activities and information objects in a hospital	<ul style="list-style-type: none"> - Specific for hospitals - Coherence between domains - Framework for information provision
Smaller Hospitals Development Framework (Department of Health, 2013)	Achieve higher quality and efficiency	Realises uniform way of acting	<ul style="list-style-type: none"> - Provide insight into hospital processes - Specific to the Irish market
eTOM Business Process Framework (TM Forum, 2016)	Give a broad view of the organization	Framework where business descriptions, processes and workflows are described	<ul style="list-style-type: none"> - Not hospital-specific - Integral framework

Table 2 Overview of process frameworks

In conclusion, there are different frameworks to identify and standardise business processes. These frameworks focus at a specific aspect of organizations and two frameworks are not specific for healthcare organizations. We did not succeed to find a framework similar as APQC-HPCF, which describe in detail which processes occur in a hospital and also describe the mission, vision, objectives and strategies. For this reason, the APQC-HPCF is deemed to be the most suitable model for the purpose of standardising a hospital's supporting processes.

3 Approach

As described in the introduction, two outpatient clinics of the Rivierenland hospital are included in our case study. The goal of a case study is to map processes by studying the environment and explaining phenomena in practice (Swanborn, 2013). Within the case study, we utilise interviews, observations and available documentation to gather information.

In order to map the processes in practice to those in the APQC-HPCF, the current situation was analysed at the clinic. This first done by consulting the Content Management System of the Rivierenland hospital, where process descriptions are stored. Secondly, six observational sessions were performed at the clinic with medical personnel. Observations will assist in understanding what actually happens in the clinical setting (Fox, 1998). During these observations the tasks performed by the clinic's staff were seen in practice, and in depth questions were asked to clarify where necessary. Finally, four interviews were performed with the unit manager of the clinic, the outpatient clinic coordinator, a medical secretary and a nurse. After collecting all necessary data, two additional interviews were held with the unit manager and the outpatient clinic coordinator of the obstetrics & gynaecology clinic to validate the results.

The three methods described above (analysing process descriptions, observations and interviews) have been used to identify the supporting processes that take place in practice.

4 Results

As a result of analysing the process descriptions in the hospital's content management system, it was found that only descriptions at the task (work activity) level were available. These include protocols that describe which steps to take in a specific situation. Looking back at the five levels of the APQC-HPCF model described in paragraph 2.1, we see that this kind of description is at a more detailed level than our intended level for mapping processes. However, during observations it was found that descriptions for specific care pathways (processes are used). These were present only for four different oncology care pathways for treatment of carcinoma at the urology outpatient clinic. In conclusion of our initial analysis, we found that there was insufficient documentation to describe processes at the process level. However, more detailed documentation in regards to tasks and activities was found.

In order to identify the supporting processes, several observations at the front office, back office, endoscopy room and medical secretary are conducted. In addition, several interviews with the unit manager, outpatient clinic coordinator and outpatient clinic employees are conducted. During the observations we identified all activities and tasks that are executed within the outpatient clinic. These activities and tasks were linked to processes.

This section describes which of the observed supporting processes we were able to map to APQC-HPCF. By mapping we mean the matching of activities and tasks that take place in practice to the processes mentioned in APQC-HPCF. Table 3 shows the supporting processes of urology outpatient clinic that are validated in the APQC-HPCF.

Besides the mapping of supporting processes, it was found that certain activities and tasks take place that we were not able to map to APQC-HPCF, but are of supportive value to the primary process. We contacted member of the PCF community and they suggested aggregating these tasks on a higher level within APQC-HPCF. However because we would like to find a consistent case-by-case match of the supporting processes, it was decided to group all supporting processes into distinctive sets. These are not defined in APQC-HPCF. The following groups of supporting processes were established:

- Logistics (the tasks and activities of the delivery of materials within the outpatient clinic)
- Pre-visit (the tasks and activities carried out prior to the patient's visit)
- Planning (the tasks and activities related to realise a patient and staff planning)
- Pre-treatment (the tasks and activities carried out before patient receives treatment)
- Post-treatment (the tasks and activities carried out after patient's treatment)
- Communication (the tasks and activities related to the communication between the staff and between the staff and patients.)

In conclusion twelve of the thirteen supporting processes of the category 4.0 'Deliver Products and Services' match case-by-case match with the urology outpatient clinic. The only supporting process that is not available within the urology outpatient clinic is 4.8.2 'Solicit discharge paper signature from patient'. In the obstetrics & gynaecology clinic, eleven out of thirteen processes are found to match with APQC-HPCF.

Within category 5.0 'Manage Customer Service' two of two supporting processes match case-by-case with the urology outpatient clinic. The same is true for the obstetrics & gynaecology outpatient clinic. Besides, there are supporting processes which are not described in the APQC-HPCF but which have supporting value to the primary process. From this we can conclude that important supporting processes not appear in the APQC-HPCF whereby this framework does not give a complete insight in the supporting processes performed at outpatient clinics.

The supporting processes were matched in both the urology clinic as well as the obstetrics & gynaecology clinic in order to compare and generalise the results. Due to time constraints, there were opportunities to include additional clinics in our case study. Observations at more clinics could provide further generalisation of results. An overview of the supporting processes provided by APQC-HPCF and matchings with the processes found in both clinics is provided in Table 3 on the following page. The presence of the supporting process defined by APQC-HPCF in the clinic is defined with a Y or N (Yes or No).

Supporting processes APQC-HPCF	Urology	Obstetrics & Gynaecology
Category 4.0 Deliver Healthcare Services		
4.2.2 Manage demand for materials	Y	Y
4.2.3 Create materials plan	Y	N
4.5.1 Update medical documentation	Y	Y
4.5.2 Review completeness of medical records	Y	Y
4.5.3 Submit and respond to information queries	Y	Y
4.6.1 Schedule the patient	Y	Y
4.6.2 Verify insurance	Y	Y
4.6.3 Register the patient	Y	Y
4.7.2 Manage throughput and schedule resources	Y	Y
4.8.1 Provide patient with discharge instructions, care education and orders	Y	Y
4.8.2 Solicit discharge paper signature from patient	N	N
4.8.3 Coordinate post-discharge services	Y	Y
4.8.4 Release patient	Y	Y
Category 5.0 Manage Customer Service		
5.3.1 Plan and manage customer service operations	Y	Y
5.3.2 Manage customer service requests/inquiries	Y	Y

Table 3 Overview of supporting processes matched between the clinics and APQC-HPCF

Considering the comparison between the urology outpatient clinic and obstetrics & gynaecology outpatient clinic, one supporting process is not matched, namely 4.2.3 'Create material plans'. This supporting process is performed at the urology outpatient clinic but not the obstetrics & gynaecology outpatient clinic. Staff indicated the use of critical medical instruments at the urology clinic, which require materials planning. Such a planning was not in place at the obstetrics & gynaecology clinic. Despite this deviation, we see a high level of consistency between the two clinics.

5 Conclusion & Discussion

In conclusion, fourteen out of fifteen supporting processes, as described in the APQC-HPCF, can be mapped to the practical situation found at the urology clinic of the Rivierenland hospital. This means that 93.3% of the supporting processes described in the APQC-HPCF occur at the urology outpatient clinic. The comparison between urology outpatient clinic and obstetrics & gynaecology outpatient clinic shows that 92.9% of the validated supporting processes of the urology outpatient clinic are match those of the obstetrics & gynaecology outpatient clinic. The use of critical tools within the urology outpatient clinic is the reason for this difference.

Both clinics deviate from APQC-HPCF in regards to process 4.8.2 'Solicit discharge paper signature from patient'. Upon further examination, we found that this process is never performed in hospitals in The Netherlands. The APQC-HPCF is designed in the United States, where regulations require hospitals to obtain a signature from the patient upon discharge. This practice is not seen in Dutch healthcare and therefore cannot be mapped to APQC-HPCF. This leads us to conclude that hospitals willing to implement process frameworks must take into account situational factors, such as local regulations and other external requirements.

There are also supporting processes present at the urology outpatient clinic that are not described in the APQC-HPCF, but are of supportive value for the primary care process. It can be concluded that important supporting processes are not described in the APQC-HPCF at level 3 'Processes'; this means that APQC-HPCF does not fully frame all of the supporting processes within outpatient clinic. An important point is that other hospitals should be aware the APQC-HPCF may not describe all supporting processes.

A point of discussion is that there are only two outpatient clinics observed and validated. This is not enough to be able to generalise the results other clinics in the hospital, or to the healthcare industry in general. It is recommended to validate the APQC-HPCF at other clinics and other hospitals to draw a validated conclusion.

Finally, we conclude that with a few exceptions, the APQC-HPCF provides a comprehensive view of supporting processes that should be present in healthcare providing organisations. Hospitals wishing to improve quality by standardising processes may find APQC-HPCF to be a useful tool, as it prescribes not only processes, but also tasks and activities at different levels of granularity. In this regard, APQC-HPCF proves to be valuable in increasing safety, reducing costs and improving performance in healthcare.

References

- APQC. (2014). *APQC Healthcare Process Classification Framework*. Houston, Texas. Retrieved from <https://www.apqc.org/knowledge-base/documents/apqc-process-classification-framework-pcf-healthcare-provider-members-excel>
- APQC. (2016). Getting Started With The PCF. Retrieved March 6, 2016, from <https://www.apqc.org/getting-started-pcf>
- Arora, V., & Johnson, J. (2006). A model for building a standardized hand-off protocol. *Joint Commission Journal on Quality and Patient Safety*, 32(11), 646–655. <http://doi.org/10.1007/s11606-009-1170-y>
- Bell, C. M., Brener, S. S., Gunraj, N., Huo, C., Scales, D. C., Bajcar, J., ... Urbach, D. R. (2011). Association of ICU or Hospital Admission of Medications for Chronic Diseases. *JAMA*, 306, 840–847. <http://doi.org/10.1001/jama.2011.1206>
- Bloomberg. (2013). Biggest Rise in Health-Care Cost Relative to Income: Countries. Retrieved from <http://www.bloomberg.com/visual-data/best-and-worst/biggest-rise-in-health-care-cost-relative-to-income-countries>
- Bloomberg. (2014). Most Efficient Health Care 2014: Countries. Retrieved from <http://www.bloomberg.com/visual-data/best-and-worst/most-efficient-health-care-2014-countries>
- Centraal Bureau voor de Statistiek. (2014). *Uitgaven als percentage van het bbp. Gezondheid, leefstijl, zorggebruik en -aanbod, doodsoorzaken; kerncijfers*. Retrieved from <http://statline.cbs.nl/Statweb/publication/?DM=SLNL&PA=81628NED&D1=93&D2=a&HDR=G1&STB=T&VW=T>
- Department of Health. (2013). *Securing The Future of Smaller Hospitals: A Framework For Development*. Dublin, Ireland. Retrieved from <http://health.gov.ie/wp-content/uploads/2014/03/SecuringSmallerHospitals.pdf>
- EFQM. (2015). EFQM Model in Action. Retrieved June 1, 2015, from <http://www.efqm.org/efqm-model/efqm-model-in-action-0>
- Luyckx, F. (2010). Why does the healthcare industry has the lowest BPM maturity? Retrieved January 24, 2016, from <http://www.ariscommunity.com/users/frlu/2010-05-23-why-does-healthcare-industry-has-lowest-bpm-maturity>
- Luyckx, F. (2012). *Enterprise BPM Roadmap Assessment*.
- Mans, R. S., Schonenberg, M. H., Song, M., van der Aalst, W. M. P., & Bakker, P. J. M. (2009). Application of Process Mining in Healthcare – A Case Study in a Dutch Hospital. In A. Fred, J. Filipe, & H. Gamboa (Eds.), *Biomedical Engineering Systems and Technologies* (Vol. 25, pp. 425–438). Springer Berlin Heidelberg. http://doi.org/10.1007/978-3-540-92219-3_32
- National Institute for Health and the Environment. (2014). *Dutch Health Care Performance Report 2014*. (M. J. van den Berg, D. de Boer, R. Gijzen, R. Heijink, L. C. M. Limburg, & S. L. N. Zwakhals, Eds.). Bilthoven. Retrieved from <http://www.gezondheidszorgbalans.nl/dsresource?type=pdf&disposition=inline&objectid>

=rivmp:259835

- NICTIZ. (2016). NICTIZ Hospital Domain Reference Model. Retrieved March 6, 2016, from <https://www.nictiz.nl/Paginas/Referentiedomeinenmodel-ziekenhuizen.aspx>
- Øvretveit, J. (2000). Total quality management in European healthcare. *International Journal of Health Care Quality Assurance*, 13(2), 74–80. <http://doi.org/10.1108/09526860010319523>
- Porter, M. E. (2010). What is value in health care? *The New England Journal of Medicine*, 363(26), 2477–2481. <http://doi.org/10.1056/NEJMp1011024>
- Rozich, J. D., Howard, R. J., Justeson, J. M., Macken, P. D., Lindsay, M. E., & Resar, R. K. (2004). Standardization as a mechanism to improve safety in health care. *Joint Commission Journal on Quality and Safety*, 30(1), 5–14.
- Swanborn, P. G. (2013). *Case Studies: Wat, Wanneer en Hoe?* (5th ed.). Boom Lemma.
- TM Forum. (2016). GB921 Business Process Framework (eTOM). Retrieved March 6, 2016, from <https://www.tmforum.org/resources/suite/gb921-business-process-framework-etom-r15-5-0/>