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Determining the True Cost to Deliver Total Hip and Knee Arthroplasty Over the Full Cycle of Care: Preparing for Bundling and Reference-Based Pricing

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ABSTRACT

The Affordable Care Act accelerates health care providers' need to prepare for new care delivery platforms and payment models such as bundling and reference-based pricing (RBP). Thriving in this environment will be difficult without knowing the true cost of care delivery at the level of the clinical condition over the full cycle of care. We describe a project in which we identified true costs for both total hip and total knee arthroplasty. With the same tool, we identified cost drivers in each segment of care delivery and collected patient experience information. Combining cost and experience information with outcomes data we already collect allows us to drive costs down while protecting outcomes and experiences, and compete successfully in bundling and RBP programs.

After decades of fee-for-service payment mechanisms, the Affordable Care Act (ACA) of 2010 [1] has accelerated the time frame for health care providers to participate in new care delivery platforms and payment models such as bundling and reference-based pricing (RBP). However, thriving in this environment, which links payments to outcomes, will be difficult and risky without knowing the true cost of care delivery at the level of the clinical condition and over the full cycle of care. We describe a recent project in which we identified true costs for both total hip arthroplasty (THR) and total knee arthroplasty (TKR). At the same time and with the same tool, we were able to collect patient experience information. Combining these two components of value, cost and experience, with outcomes data we already routinely collect will not only allow us to drive improvements in all three areas (outcomes, cost and experiences) of the value equation, but compete successfully in bundling and RBP programs.

Our project combined Time-Driven Activity-Based Costing (TDABC) as developed and described by Kaplan and Porter[2,3] with the Patient and Family Centered Care Methodology and Practice (PFCC M/P), developed by Dr. Anthony DiGioia at the University of Pittsburgh Medical Center (UPMC). [4–11]. TDABC identifies the true cost of care at the level of the clinical condition over the full cycle of care by creating process maps of the flow of care and identifying the types and costs of resources used in each step of the process maps (personnel, space, equipment, and consumables) for a given clinical condition. The PFCC M/P, developed in 2006 and first used in The Bone and Joint Center (BJC) at Magee-Womens Hospital of UPMC, allows care providers to partner with patients and families to redesign care delivery. Through six simple steps (Table 1), the PFCC M/P requires us to view the experience of care through the eyes of patients and families, allows us to identify the current and ideal states of care delivery as defined by patients and families, and then provides a mechanism for cross-functional teams of care providers to close the gaps between the current state and the ideal. Identifying the current state of a care experience through the PFCC M/P approach involves process mapping (which in PFCC terms is called Care Experience Flow Mapping) using a tool called Shadowing, which is the real-time observation of patients and families through each segment of their health care journey. The PFCC M/P has been found to improve all three components of value in health care — experience, outcomes, and costs [4–11] — what we call the PFCC Trifecta.

Our goals for this project were three-fold, to: (1) identify the true cost of care delivery for THR and TKR over the full cycle of care (the full bundle being defined as 30 days before surgery to 90 days post-surgery), (2) take advantage of the inherent synergies between TDABC and the PFCC M/P by using Shadowing (prior to face-to-face discussion among department heads and subject experts) as the link between the two approaches, and (3) show how one tool with a patient centered focus can determine the necessary information to drive improvements

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Table 1
Six Steps of the Patient and Family Centered Care Methodology and Practice (PFCC M/P).

Step 1: Define the care experience for improvement, including the beginning and end points
Step 2: Create a PFCC Guiding Council to lead the effort and break down barriers
Step 3: Define the current state of the care experience through Shadowing, surveys, and other tools
Step 4: Expand the PFCC Guiding Council into a PFCC Working Group with representative from every "touchpoint" of the care experience identified through Shadowing
Step 5: Write the ideal story, from the patient and family's perspective and in first person
Step 6: Create PFCC Project Teams to close the gaps between the current and ideal state

in all components of value (outcomes, experiences and cost) by improving processes and gathering the information needed to successfully participate in bundling and RBP programs.

Materials and Methods

The first step of both TDABC and the PFCC M/P is to define the beginning and end points of the clinical condition under review. For this project, we defined the beginning and end points of our bundled care pathway as 30 days prior to 90 days post-THR and TKR surgery. We chose to focus on the "typical" THR and TKR patient and initially the patients of one surgeon who has instituted a highly standardized care pathway for routine total joint arthroplasty (TJR) to reduce variation. Further, these were low acuity patients (the group of patients targeted, nationally, for bundling programs). Our past experience of Shadowing many TJR patients, as well as patients in a wide variety of other clinical conditions (e.g., bariatrics, trauma services, hysterectomy, etc.) has shown that this number is supported and appropriate for a low variation, highly standardized care delivery system. We decided, up front, to later expand our work to include atypical care pathways (e.g., patients with significant co-morbidities or those who experience post-surgical complications) and multiple surgeons and facilities. The next step in both TDABC and the PFCC M/P is to identify the segments of care (Fig. 1) for the clinical condition under review followed by creation of a process map for *each* of these segments of care. We developed a hybrid type of process map (Fig. 2), combining elements of the PFCC M/P care experience flow map (where the patient and family go, who they come into contact with, and for how long) with elements of the TDABC process map (which includes the resources used at each step — personnel, equipment, space, and consumables) developed by Dr. Kaplan [3]. The same approach can be used for less standardized, less homogenous patient populations (e.g., patient populations presenting a variety of co-morbidities or courses of treatment that result in multiple care pathways) by creating additional "nodes" on the process maps denoting the additional or alternative care pathways and resources used. The standard method of creating process maps in the TDABC approach is to gather subject experts (e.g., department heads, unit managers, clinical leaders) who create the maps through face-to-face iterative discussion. We instead created the process maps through Shadowing (with the process maps later verified by subject experts) in order to more accurately and efficiently identify the true flow of care and the resources used at each segment of care delivery.

The hybrid process map also includes "behind-the-scene activities" such as central sterile processing and billing, non-direct personnel time, and patient and family waiting time. To create the process maps and to identify the times per step within the process maps, we Shadowed patients and families through each segment of primary THR and each segment of primary TKR three times each (6 patients and families in total). The Shadowing took place on multiple days over several weeks in order to capture all of the segments to create full bundle process maps. Due to highly standardized care pathways in the BJC these patients were representative of the typical primary THR and TKR patient for this surgeon and represented 95% of all of this surgeon's primary THR and TKR patient experiences.

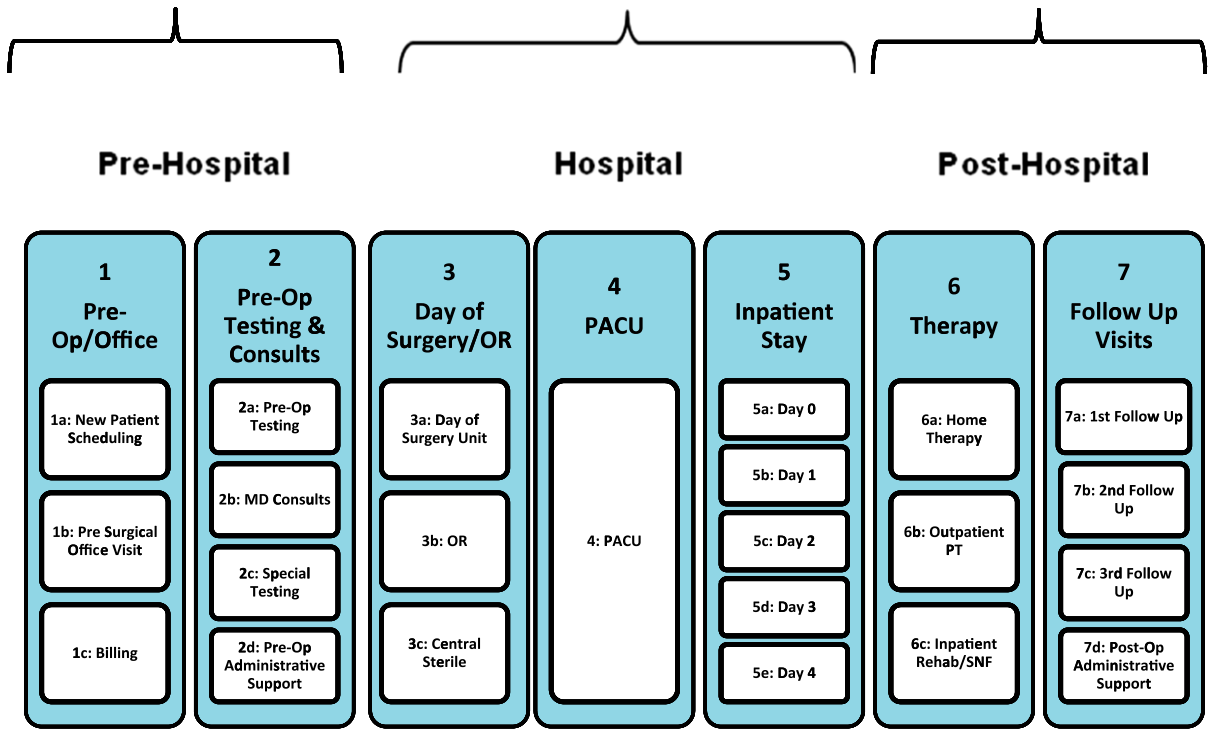

Fig. 1. A visual representation of the *segments of care* of the full bundle for total joint arthroplasty surgery; process mapping via Shadowing was completed for each segment/sub-segment of care represented.