

Lean Business Model and Implementation of a Geriatric Fracture Center

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KEYWORDS

- Geriatric fracture center • Hip fracture • Fragility fracture • Lean business methods
- Implementation • System of care • Business planning

KEY POINTS

- Lean business models are applicable to medicine.
- Lean business models allow the simultaneous improvement in quality with reduction in costs of care.
- The geriatric fracture center model of care is one example of successful implementation of a lean business model for hip fracture care.

INTRODUCTION

The population is aging rapidly, and the resulting demographic shift will create changing needs for care of older adults. One of the more common problems suffered by older adults is hip fracture.^{1,2} Hip fracture is often associated with complications, disability, and death.¹ The loss of independence is also commonly associated with a hip fracture in the older adults.³

From an economic standpoint, hip fracture is the third most costly diagnosis in American medicine.⁴ It is also common, with 330,000 hip fractures occurring annually in the United States.⁵ This number is expected to increase with the increasing numbers of older adults.⁶ Reported mortality in the United States is 3% inpatient mortality and 21% to 24% 1-year mortality for patients with hip fracture.^{1,5,7} The average length of stay in the United States is 6.4 days, and this represents a significant use of hospital bed capacity across the country.⁵ In addition, an average of 14.5% of patients discharged after hip fracture are readmitted within 30 days.⁸

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From a cost and outcomes perspective, improvement of these statistics is desirable and may be achievable with improvement in the care delivery model. In this article, some methods that may be used to improve the quality, safety, and cost of care for patients with hip fracture are discussed.

WHAT IS A LEAN BUSINESS MODEL AND WHY IS IT RELEVANT TO HIP FRACTURE CARE?

Historically, there have been 3 distinct business models used in production settings around the world. These models have been used in many business settings, and an understanding of them is beginning to reach health care settings. In the following section, a brief history of these business models and why they are important considerations for care model improvement are reviewed.

Before 1911, essentially all productivity was based on craft production.² In craft production, individual goods and services were produced by skilled craftsmen, artisans, and service workers.² Each item differed from the others slightly. This model began with the site of production. Craft shops were disorganized, and often required a great deal of space. Likewise, the supply chains for such settings were best described as variable and often unreliable. Thus, the products of craft production were variable in quality and dependent on the individual craftsman. Productivity was often slow and dependent on the variable supply chain and variable workforce.

Beginning in 1911, Henry Ford introduced standardization to manufacturing by implementing standardized interchangeable parts for the cars he produced.² He relentlessly worked to create standardized work processes for his car assembly operations and for his supply chains. In 1914, he introduced the moving assembly line to car manufacturing.² During the subsequent 15 years, he was able to improve productivity, quality, and efficiency of production. During this period, he was able to reduce costs and sell his vehicles at lower prices to the public. This introduction of standardized practices to work became known as mass production.²

Henry Ford focused on careful use of his resources, including recycling of defective steel parts, reuse of purpose-designed shipping crates as floor boards for his Model T vehicles, and continued cycles of quality improvement during car production. Mass production plants were large, with many workers, and were also noted to require large quantities of parts and supplies on hand to dampen any variation in availability of parts for the supply chain.

Mass production was associated with problems as well. Mass production of vehicles resulted in many errors, and some vehicles at the end of the assembly line were not functional. Therefore, skilled craftsmen were required to fix the vehicles and prepare them for delivery. The assembly facilities were vast and wasted a great deal of space. Changeover times for production of different types of parts, vehicles, and services were long and expensive. There was a great deal of wasted supplies. Large quantities of supplies were required to be on hand to feed the assembly line. Quality remained variable.

Beginning in 1950, W. Edwards Deming, Taiichi Ohno, Eiji Toyoda, and Kiichiro Toyoda instituted what is now known as lean production or the Toyota Production System in Japan.^{2,9} This model was first applied to motor vehicle production. Dr Deming was present in postwar Japan working for the US Department of the Army as an advisor.² He trained the Toyoda family and the Toyota workers to use different methods to be able to produce vehicles with limited resources, less production space, faster changeover times, and higher quality.² This process of vehicle production has become known as the Toyota production system. He implemented the plan, do,

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