

UNIVERSITY OF HAWAI'I LIBRARY

IMPROVING MANAGERIAL ACCOUNTING PRACTICES AND THEIR EFFECTS ON
COSTS OF LOGISTICS IN HOSPITALS: A COMPARISON OF HOSPITALS IN THE U.S.
AND FRANCE

A THESIS SUBMITTED TO THE GRADUATE DIVISION OF THE
UNIVERSITY OF HAWAI'I IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF ACCOUNTING

MAY 2008

By
Michèle Pomberg

Thesis Committee:

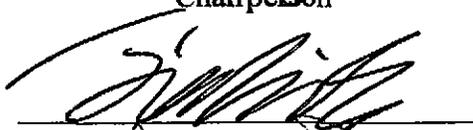
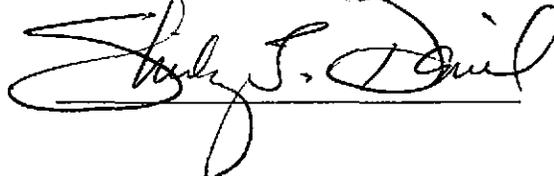
Hamid Pourjalali, Chairperson
Shirley Daniel
Jialin (Keven) Sun

We certify that we have read this thesis and that, in our opinion, it is satisfactory in scope and quality as a thesis for the degree of Master of Accounting.

THESIS COMMITTEE

A handwritten signature in cursive script, appearing to read "Mervin S. Jaler", written over a horizontal line.

Chairperson

A handwritten signature in cursive script, written over a horizontal line.A handwritten signature in cursive script, appearing to read "Judy S. Divil", written over a horizontal line.

ACKNOWLEDGEMENTS

I would like to express my sincere thanks to Hamid Pourjalali for his permanent encouragement, understanding and personal guidance and a special thanks to him and Olivier Aptel for providing me with the survey data for this research.

ABSTRACT

This paper investigates logistics differences between hospitals in the U.S. and France. This research extends prior research that compared hospital logistics functions in France and the U.S. in 1998 and discusses reasons for observed differences. Respondents in both countries indicated the need for further development of logistics functions by implementing new management information and control systems to reduce logistics costs. The first objective of the paper is to examine the current status of logistics activities in hospitals in both countries. The second objective is to find out whether the perceived and actual environmental changes resulted in planned and actual changes in logistics activities. Differences in logistics practices are drawn from variables such as: Responsibilities of logistics departments, Medical Supplies, and Strategic Alliances (Medical, Vertical, and Horizontal Logistics Collaborations; Outsourcing; and Future of Strategic Alliances)

The results provide evidence that French hospitals have been able to reduce supplies inventory levels to a larger extent than their counterparts in the United States. In general, French hospitals reported more success in implementing advanced logistics functions than their U.S. counterparts. U.S. hospitals entered into outsourcing of their logistics functions more often than the French hospitals. I attribute these differences to changes in financing and regulations in the French healthcare industry. I did not find significant changes in financing and regulations in the U.S. healthcare industry.

TABLE OF CONTENTS

Acknowledgement.....	iii
Abstract.....	iv
List of Tables.....	vi
List of Figures.....	vii
Chapter1: Introduction.....	1
1.1 Background.....	1
1.2 Objectives.....	1
1.3 Comparison: The French and the U.S. healthcare industry.....	3
1.4 Healthcare costs.....	3
1.5 Differences in providing and financing healthcare.....	5
1.6 New developments in healthcare delivery and finance.....	6
Chapter 2: Cost Accounting Issues.....	9
Current managerial (cost) issues in the healthcare industry.....	9
Chapter 3: Method.....	14
Data Selection and Collection.....	14
Chapter 4: Analysis.....	17
4.1 Data Analysis.....	17
4.2 U.S. Results.....	18
4.2.1 Logistics Departments.....	18
4.2.2 Medical Supplies.....	19
4.2.3 Strategic Alliances.....	21
4.2.3.1 Medical collaboration.....	21
4.2.3.2 Vertical logistics collaboration.....	22
4.2.3.3 Horizontal logistics collaboration.....	22
4.2.3.4 Outsourcing.....	23
4.2.3.5 Future of strategic alliances in the U.S.....	24
4.3 French Results.....	26
4.3.1 Logistics Departments.....	26
4.3.2 Medical Supplies.....	27
4.3.3 Strategic Alliances.....	28
4.3.3.1 Medical collaboration.....	28
4.3.3.2 Vertical logistics collaboration.....	28
4.3.3.3 Horizontal logistics collaboration.....	28
4.3.3.4 Outsourcing.....	29
4.3.3.5 Future of strategic alliances in France.....	30
4.4 Comparative Analysis.....	31
4.4.1 Logistics maturity.....	31
4.4.2 Comparison of collaboration, outsourcing and the future of strategic alliances.....	35
4.5 Comparative analysis using indices.....	35
Chapter 5: Summary and Conclusion.....	40
References.....	44
Appendix.....	47

LIST OF TABLES

<u>Table</u>	<u>Page</u>
1. Number/Percentage of Respondents in Hospitals by Size.....	16
2. Reported Outsourcing in the U.S.....	23
3. Future of Strategic Alliances in the U.S.....	25
4. Reported Outsourcing in France.....	29
5. Future of Strategic Alliances in France.....	30
6. A Comparison of Responsibilities Given to Logistics Services in the U.S. and France.....	33
7. Comparison of the aggregate values for U.S. and French Respondents 1998-2005.....	39
8. Summary of responses to four topics for the U.S. and France.....	41

LIST OF FIGURES

<u>Figure</u>		<u>Page</u>
1.	Comparison of Relationship between French and U.S. Maturity of Logistics and Partnership Index in 2005.....	37

CHAPTER 1

INTRODUCTION

1.1 Background

Economic, political and demographic factors have led to continual attention to health care issues. The rapid growth of health care costs in both private and public sectors is probably the main reason for this increased attention. The aging of the population, increased demand for health care services, the rising cost of inpatient and outpatient care, professional shortages, new technology, and new drugs will continue to drive up the cost of health care. Before the introduction of diagnosis-related groups (DRGs) in 1983 in the U.S. (and 1986 in France), hospitals focused mainly on revenue maximization rather than cost control. With the DRGs system, hospitals are reimbursed based on the type of service provided; therefore, with its introduction hospitals shifted their attention towards cost control to improve their financial well being (profitability). Control of logistics activities, which is considered a main part of hospital costs, can affect the cost structure of healthcare organizations.

1.2 Objectives

France and the U.S. have different social and economic systems; and their healthcare systems, and consequently their logistics practices, may be different. The objective of this study is to present insights into hospitals' logistics functions in France and the United States. In a previous study, Aptel and Pourjalali (2001) reported that managers of logistics departments in the U.S. and France intended to improve their

logistics to advance efficiency and to reduce costs. The current study extends Aptel and Pourjalali (2001) to examine whether these reported efforts were successful and if so, how. I will study the movement in logistics functions from 1998 to 2005 in both countries and provide some basis for differences observed between the two countries. I will examine the current status of the logistics activities in hospitals in both countries and determine whether the perceived and actual environmental changes resulted in planned and actual changes in logistics activities. This study reports on how hospitals have tried to implement and extend known managerial (accounting) systems to reduce costs and/or to improve efficiencies. It is expected that the level of change will be higher for French hospitals, as they indicated a greater desire to use more advanced management and accounting information systems (Aptel and Pourjalali, 2001). Furthermore, the French healthcare system has been subject to more regulations during the last decade than the U.S. healthcare system.

In this first Chapter, I will proceed with a comparison of the healthcare industry in France and the U.S. to justify my expectations for the differences in logistics functions. In Chapter 2, I provide an overview of current managerial issues in healthcare and hospital systems. Chapter 2 also provides some background on how hospitals have attempted to control costs, specifically, a brief mention of activity-based management (costing), just-in-time, outsourcing, and evidence-based management/evidence-based best practice. Chapter 3 reports on the empirical part of the study with the data selection and collection, and the analysis of my data is reported in Chapter 4. The summary and conclusions of the study are reported in Chapter 5.

1.3 Comparison: The French and the U.S. healthcare industry

Both the French and the U.S. healthcare systems face many challenges. Among these challenges is the difficulty of coping with rapidly increasing healthcare expenditures. A growing elderly population and more expensive medical treatments and technologies will continue to influence public spending priorities in both countries. In the U.S, the federal government has been dealing with a growing number of Americans without medical insurance. In France, insufficient resources have led to strikes by medical doctors and others, while increases in health care costs have led to larger budget deficits.

In a ranking by the World Health Organization, the French healthcare system was the best in the world in 2001 because of its universal coverage, responsive healthcare providers, patient and provider freedoms, and the health and longevity of the country's population. This organization ranked the United States 37th.¹ The most important factor in the differences between the rankings of France and the United States was the large number of Americans whose access to care was limited because of their lack of health insurance. Below, I provide a more detailed explanation of the U.S. and French healthcare systems.

1.4 Healthcare costs

In both France and the U.S., health expenditures have tripled since 1960. Despite U.S. citizens' limited access to coverage, the United States still spends far more on its

¹ Measuring overall health system performance for 191 countries, World Health Organization.2001. at <http://www.who.int/healthinfo/paper30.pdf>, accessed 11/20/2007.

health care system than any other country. In 2005, the U.S. spent approximately 2 trillion dollars on health care, or \$6,401 per person.² Healthcare spending rose 6.9%, the third year of growth deceleration. The slowdown was driven by a weaker growth in prescription drug spending.² As a share of GDP, healthcare spending grew to 15.3 % in 2005.³ Hospital spending, the largest share of national health expenditures, accounted for 31% of total health care costs. In addition, hospitals faced a battle for talent because of the shortage of doctors, nurses, and medical technicians, which hospitals must now pay more to recruit and retain.

In France, hospital funding is still subject to macroeconomic regulation. National financial targets are set to control overall spending. In 1997, parliament voted for an annual national health insurance spending objective (ONDAM) with financial target limits on spending (Bellanger and Tardif, 2006). Under the Social Security Act of 2003, which was effective in 2005, those targets for hospitals have depended on the type of activity, either public or private (for profit), and on the hospital status. Compared to the U.S., France was the third in healthcare spending among all OECD countries. French healthcare expenditures were 11.1% of GDP in 2005.³ Studies by the French Ministry of Health have shown that costs vary widely among French hospitals. These differences are attributed to regional differences.

² Source: Centers of Medicare and Medicaid Services - Office of the Actuary: Data from the National Health Statistics Group, NHE summary including share of GDP, 1960-2005, http://www.cms.hhs.gov/NationalHealthExpendData/02_NationalHealthAccountsHistorical.asp, accessed 11/20/2007.

³ data from OECD Health Division, June 2007, <http://www.oecd.org/dataoecd/46/36/38979632.xls>, accessed 9/20/07.

1.5 Differences in providing and financing healthcare

The US government plays a much smaller role in the healthcare sector than does the government in France. Privately-owned hospitals dominate the US market. Their market share accounts for approximately 60% of the market for all hospitals. State and local hospitals only account for 22% of the U.S. hospital market.⁴ Thus, researchers usually use micro-economic theories to analyze and understand the U.S. healthcare sector. For example, several studies have found that physicians and hospital administrators in the U.S. respond to economic incentives in a rational manner and there is growing evidence that agency theory explains the choice of compensation contracts in healthcare organizations (e.g., Brickley and Van Horne, 2002).

In the U.S., the health care system is financed by employee/employer insurance, Medicare and Medicaid for the elderly and some of the poor, and the Veterans' Administration for the military. The system leaves many of its citizens underinsured and around 45 million without healthcare insurance. In comparison, France has a universal and tax-financed healthcare system. The Statutory Health Insurance system as a branch of the general social security system is responsible for the financial management of health care. A total of 35% of healthcare finance comes from general taxation in France (Maynard, 2005). The U.S. Federal Government reimburses approximately 33% of all healthcare expenditures, mainly through Medicare—the health insurance program for individuals over age 65—and through Medicaid—a program for disadvantaged

⁴ Source: American Hospital Association website: <http://www.aha.org/aha/resource-center/Statistics-and-Studies/fast-facts.html>, accessed 9/20/2007.

individuals.⁵ Federal, state and local government funding together cover about half of all healthcare expenditures in the U.S.

France's social insurance system is mainly free for consumers at the time of use and covers the country's whole population. The system is based on the principle of solidarity and ensures access to care on the basis of need. About one third of all French hospitals are private not-for-profit hospitals, which enjoyed their own reimbursement system until 2005. Doctors working in these private hospitals were and still are paid directly for their activities on a separate fee-for-service basis comparable to their colleagues in ambulatory care. Healthcare costs show large disparities in the different regions, reflective of historical negotiation processes. The remaining two-thirds of French hospitals (beds) belong to the public sector. Until 2004, French public hospital funding was dependent on a nationwide budget (based mostly on historical costs).

1.6 New developments in healthcare delivery and finance

Given the significance of healthcare costs and the public interest in it, healthcare policy reforms continue to be a constant factor in the political arena, both in France and in the U.S. During the last decade, the delivery, the financing, and the accountability in healthcare systems have been subject to permanent changes in both France and the U.S. How costing information is collected and how reimbursement rates are calculated differ significantly among countries, but Schreyögg et al. (2006) show that decisions on

⁵ source: Medicare and Medicaid website: approximately one third of the population is covered by Medicare and Medicaid
<http://www.cms.hhs.gov/MedicareProgramRatesStats/downloads/MedicareMedicaidSummaries2005.pdf>, accessed 11/20/2007.

spending are made after hospitals consider the price (or reimbursement rates) of their services. Although differences between hospitals can result in differences in management and/or costing systems, France has applied some practices similar to those in the U.S. to contain and control costs in its healthcare industry.

To control expenditure growth and to avoid waste of resources, France has emphasized the role of co-payments. Stated differently, the French government has decided to introduce significant user charges for patients in order to contain costs instead of focusing on the supply side. To improve efficiency, France has introduced hospital payment systems based on diagnostic-related groups (DRG) where the payment unit is the hospital stay. The first version of French DRGs was published in 1986. At its introduction, the prospective payment system (PPS) covered on average 10% of the amount of acute hospital care. This percentage was intended to increase to 50% by 2007 and to 100% by 2012. Normally, a transition arrangement allows for the full implementation of the system in medium and long terms (e.g., Bellanger and Tardif, 2006). Since 2005, the system has been successful in for-profit-private hospitals that were entirely funded by the PPS⁶ and were paid for their actual activity. A transition arrangement has also allowed the harmonization of all tariffs until 2012. An average cost per DRG is used for calculation purposes; therefore each DRG has a nationally defined price.

The quality of the managerial/cost accounting system is an extremely important factor in determining prices, along with costs in hospitals. The following section provides

⁶ The PPS system assumes that the price does not vary from hospital to hospital. But hospitals have different structures and patients differ in their characteristics. Therefore, experts are considering the introduction of a generalized adjustment coefficient and price variations for patients with specific treatments to increase incentives for hospitals to improve efficiency.

more detailed coverage of managerial and cost accounting issues in the healthcare industry.

CHAPTER 2

COST ACCOUNTING ISSUES

Current managerial (cost) issues in the healthcare industry

With advances in medical science and technology, the healthcare system is changing rapidly. These advances have increased the quality and delivery of healthcare and, inevitably, costs. Although increasing uncertainty and industry-wide changes over the years have led to a higher demand for accurate information for planning and control, many hospital cost systems are still very different in their functionality⁷.

In the last two decades, governments in many countries have tried to control increases in healthcare costs by changes in healthcare policies and regulations (such as adjustments to payment systems). The prospective payment system (PPS) has widely influenced internal management and management accounting systems in health care institutions. For example, Hill (2000) reports that many hospitals without any appropriate management system had to adopt a cost system after the introduction of PPS by Medicare. In general, health care institutions can be motivated to change their management and accounting systems if the external situation demands it⁸.

⁷ Although it is a common belief that there is a correlation between a better functional cost accounting system (which produces more relevant and useful data) and the ability of managerial decision makers to improve economic performance, not much evidence exists that links cost system design to economic performance. Pizzini (2006) shows that financial performance is positively related to a cost system only when the cost system provides significant details.

⁸ Since these changes impose costs on healthcare institutions, identification of their impact on the quality of care provided and developing strategies to contain those costs are very important for hospitals (Finkler, 2003).

Before using DRGs (when the U.S. and France had a cost-plus reimbursement system), hospitals were able to increase their profitability by increasing the number of patients treated. Competition among hospitals was based on quality, which led to offering more advanced technology, better facilities, and more extensive services to attract more patients. The more intense the competition, the higher the level of services provided (Keeler et al. 1999). This quality competition lowered the demand for information for cost control (Krishnan, 2005). To improve hospitals' incentives to control costs, the federal government changed the reimbursement structure from a cost-plus to a fixed-price system. The risk of high costs was shifted from third-party payers to hospitals and physicians. In essence, the fixed-price regulation shifted the basis of competition in the hospital market from quality to price (Dranove, 1988) and increased the demand for cost reduction in such markets. Hospitals used activity-based management (costing), just-in-time, outsourcing, and more recently evidence-based management/evidence-based best practice (EBBP) to reduce costs.

The health care industry seemed to be one of the most promising areas for activity-based management/costing. In 1997, approximately 22% of all US hospitals were using an ABC system (West and West, 1997). Because activity-based costing has achieved a position of some prominence as a technology for managers in the healthcare industry, one could assume that it is widely used in the industry by now. But more current research shows that this is not the case (e.g., Lawson, 2004). Since hospitals have a greater complexity than other healthcare providers and thus a greater implementation cost, the results are not surprising. Other studies found that ABC as a management tool does not reveal more accurate cost estimations than other conventional techniques of cost

allocation (Armstrong, 2002). Other techniques (such as budgeting, benchmarking, and strategic planning) are used more often in healthcare organizations. Given the findings of prior research, I have not included survey questions about implementation and/or use of activity-based management/costing in the study.

Since one of the most expensive items for is the cost of medial supplies, the healthcare industry is a perfect industry in which to apply elements of the just-in-time (JIT) system. JIT is a business approach of supplying a product or service when it is needed, and with the exact quantity needed (Whitson, 1997). Material management and pharmaceuticals are the most likely areas where JIT can be adopted in the healthcare sector. Another important element of JIT in a healthcare setting is a flexible workforce. Many organizations have tried to solve their staffing issues with the JIT technique. Hospitals have, for example, redesigned their nursing units according to the concept of patient-focused care, which includes the use of workers with multiple skills. Numerous hospitals are using external staffing companies with many vendors, units, and also many different disciplines. Today, many hospitals deal with as many as 20 to 30 different staffing companies (Shaffer, 2007). My study will specifically measure this aspect of managerial cost control in French and U.S. hospitals.

Another method of cost reduction is outsourcing. Outsourcing can improve efficiency and consequently reduce costs. With advances in the Internet and other technologies, economic entities can easily use contractors in countries where labor is less expensive. As hospitals are heavily labor intensive, accounts receivables and account payable departments and other less technical areas with a large number of employees can

be easily outsourced. Because salary expenses are considered hospitals' largest expense,⁹ the healthcare industry may benefit from outsourcing at a much higher rate than most other industries.¹⁰ For example, on average large European hospitals spent around 33% of their budgets on logistics and supply chain activities in 2001.

Kane (2007) reports that the three most common models are complete outsourcing; an in-house model, where all control for managing the supply chain stays within the hospital; and a hybrid model, which is a combination of both. Generally, financially healthy hospitals have more opportunities to keep their supply chain in-house or work with the hybrid model, whereas those that are financially troubled are better off with the complete outsourcing model. The healthcare function that is most commonly outsourced (Shinkman, 2000) is information technology (29%), followed by finance (20%), and support services (19%). Outsourcing information technology functions, for example, has long been seen as having high potential for cost savings: the health care industry is an IT intensive industry and regulatory mandates have resulted in increased standardization of transaction processing, security, and privacy information. Outsourcing IT functions in health care exceeded 2 billion dollars annually in 2005 (Ciotti and Pagnotta, 2005), but non-management IT functions are more likely to be outsourced, especially where computerized patient data is more widely used (Lorence and Spink, 2004).

⁹ In recent years, however, the cost of supplies has been increasing by a larger percentage than the cost of labor.

¹⁰ Results from a survey of the Institute Superieur de Logistique Industrielle (ISLI) in Bordeaux. The ISLI survey also found that it cost one French hospital around 120 million Euros to operate its supply chain (Tierney, 2007). This suggests that economic incentives should be present to increase the efficiency of the supply chain.

Other changes, some as a result of cost reduction efforts, have also been implemented. For example, the U.S. health care system witnessed a number of structural changes such as substantial increases in the number of hospital closings, horizontal mergers, and vertical combinations. Managed care firms have now penetrated the market. Greenberg and Goldberg (2002) show that increased competition led to the formation of vertically integrated systems of hospitals and health maintenance organizations (HMOs). The market for new systems such as HMOs, however, has been very volatile and many of these systems have not survived. A more recent change is evidence-based management/evidence-based best practice (EBBP).

Evidence-based management is a decision-making tool in which information decision-makers rely on is based on evidence related to the operation. During the last few years, health care managers have attempted to use evidence-based management for cost containment and control. Generally, however, the problem of using evidence-based management is the lack of “evidence” of its success. That is, researchers have not been able to determine if observed attempts at cost control and containment in hospitals have resulted from the evidence-based management strategy or from other strategies. My study tries to show which managerial (accounting) strategies hospital management uses to contain costs and improve efficiencies in logistics activities.

CHAPTER 3

METHOD

Data Selection and Collection

In their 2001 study (based on data collected in 1998), Aptel and Pourjalali compared responses from French and U.S. hospitals to a questionnaire¹¹. The questionnaire was written in English, translated to French, and finally translated back to English to make sure that the French and English questions carried the same meaning. In the current study, I used the same questionnaire (with very small adjustments in response to changes in time) to create the opportunity to compare the results of my survey in 2005 to those in 1998. I used the same methodology to obtain information as in the prior study. For example, I limited my comparison to hospitals located in France and the U.S. and I used the same (or a similar) database to obtain the names and addresses for hospitals. However, in the first study, the sample was limited to U.S. hospitals in California. In 2005, using the American Hospital Association's Annual Directory, surveys were sent out to all hospitals in California, Washington, and Hawaii (west coast states); New York (on the east coast); and Texas (a large southern state). These states were selected based on their large numbers of hospitals and the degree of information available for each hospital in each State (e.g. address, size, operation, and financial information), in order to have a more diverse representation of hospitals in the U.S.^{12& 13}. Hospitals in Hawaii (a

¹¹ The survey questionnaire is in Appendix.

¹² Data availability provides the opportunity to extend our research to other areas

¹³ A comparison of our results for only-California respondents vs. other-than-California respondents in the

total of seven) were included because of the ease of access to the management of these hospitals in case in-person interviews were needed. Similar to 1998, questionnaires were sent to all French hospitals based on the list provided by the Health and Social Affairs Ministry. But French clinics were excluded from the sample because these private units are small and their operation is very different from a hospital, making comparison between hospitals difficult.

A total of 1320 survey questionnaires were sent to the U.S. hospitals and a total of 678 questionnaires were sent to French hospitals. Table 1 presents information about the sizes of the sample hospitals in both countries. In the U.S., I observe a wide spread—with more responses from medium-sized hospitals (hospitals with 50 to 300 beds). However, larger hospitals were the ones who were more responsive to the survey questionnaire in France. French respondents had an average size of 887 beds (the smallest respondent had 90 beds) while American respondents had an average size of 225 beds (the smallest respondent had 16 beds). The sizes of the sample hospitals are very similar to those from the survey in 1998.

U.S. did not provide a statistically significant difference. We have not yet extended our study to include other variables for comparison purposes.

Table 1
Number/percentage of Respondents in Hospitals by Size

Panel A: The number of respondents in different hospital sizes

Hospital Size (Number of beds)	6-24	25-49	50-99	100-199	200-299	300-399	400-499	500+	Total
U.S. sample	6	34	37	40	25	18	7	15	182
France sample	0	0	2	8	4	6	4	31	55

Panel B: Percentage of respondents in different hospital sizes

Hospital Size (Number of beds)	6-24	25-49	50-99	100-199	200-299	300-399	400-499	500+	Total
U.S. sample	3.3%	18.7%	20.3%	22.0%	13.7%	9.9%	3.9%	8.2%	100%
France sample	0.0%	0.00%	3.6%	14.6%	7.3%	10.9%	7.3%	56.4%	100%

Note: While all French respondents answered the size of their hospitals, eleven (11) U.S. respondents did not answer this question.

CHAPTER 4

ANALYSIS

4.1 Data Analysis

I anticipated that because of differences in the social and economic systems in France and the U.S., healthcare systems and consequently logistics practices would be different. This section presents insights into hospitals logistics functions in France and the United States. The current study extends Aptel and Pourjalali (2001) to examine how and if efforts reported in 1998 by logistics departments in France and in the U.S. were successful. I will examine the current status of the logistics activities in hospitals in both countries and determine if the perceived and actual environmental changes resulted in planned and actual changes in logistics activities. This study will report on how hospitals have tried to implement and extend known managerial (accounting) systems to reduce costs and/or to improve efficiencies.

It is expected that the level of change will be higher for French hospitals, as they indicated a stronger desire to use more advanced management and accounting information systems (Aptel and Pourjalali, 2001). Furthermore, the French healthcare system has been subject to more regulations during the last decade than the U.S.

healthcare system. The survey addresses the following questions:

1. Responsibilities of logistics departments
2. Medical Supplies
3. Strategic Alliances:
 - Medical collaboration
 - Vertical logistics collaborations
 - Horizontal logistics collaborations
 - Outsourcing
 - Future of strategic alliances

To facilitate reporting, I divided my results into three parts. First, in Parts 1 and 2 I discuss hospitals in each country. In Part 3, I compare important findings for each country and how the results are different from results reported in Aptel and Pourjalali (2001).

4.2 U.S. Results

4.2.1 Logistics Departments

Almost all U.S hospitals¹⁴ reported having a logistics department. Respondents said their logistics function had the following responsibilities in descending order (the percentage of the respondents that considered the function as a responsibility of the logistics department is mentioned after the function):

- Receiving (86.38%);
- Internal distribution to medical departments (86.34%);
- Supplying (81.51%);
- Purchasing (80.64%);
- Inventory management (80%)

As the above list indicates, the logistics departments have the main responsibility for direct support of inventory (purchasing, supplying, receiving, inventory control, internal distribution). Other functions of logistics departments are reported as follows.

- Management information system (28.86%)
- Linen service (20.11%)
- Transportation (19.01%)
- Maintenance and environment (12.33%)
- Foodservice (6.63%)
- Home medical care (3.71%)
- Telemedicine (2.26%)

¹⁴97.93% (98.6% in 1998) reported the existence of logistics department.

While the direct support function of logistics departments declined from 1998 to 2005, the indirect support function of logistics declined even more. For example, the results in 2005 show a 19% reduction in having MIS as a part of logistics departments compared to 1998. One possible explanation is that MIS functions are more and more incorporated within other functional areas and/or are more and more outsourced. My results suggest the latter.

4.2.2 Medical Supplies

The average cost of medical supplies (reported by only 56% of respondents) is approximately \$5,486 per bed. Compared to our data in 1998, the dollar value of inventory kept per bed in the U.S. hospitals has increased by an average of 37%. This increase could be the result of an increase in the level of supplies, increases in the cost of medical supplies, or both¹⁵. There is no question that the cost of medical supplies has increased over the years (5.2% in 2007 based on the consumer price index summary¹⁶). In either case, it is evident that the (at least perceived) cost of medical supplies of hospitals per bed increased between 1998 and 2005.

Based on respondents' comments, medical supplies are normally distributed to medical departments via a central warehouse. Another alternative respondents mentioned is the distribution of these supplies directly to medical departments via the suppliers¹⁷.

¹⁵ Interestingly, respondents (on average) believe that the level of inventory had remained the same for the previous five years. This may indicate that, opposite to their suggested "need for decrease in inventory," they do not find a decrease in the level of inventories appropriate and/or necessary.

¹⁶ <http://www.bls.gov/news.release/cpi.nr0.htm>, accessed 1/20/2008.

¹⁷ A substantial amount of inventory (on average 45.55%) is reported to be in the central warehouse and an average of 36.98% is placed inside the medical departments.

The use of the latter method increased greatly (by over 35%) over the 1998-2005 period. This method, closest to a just-in-time approach, has found more popularity, but still the majority of medical supplies are distributed via a central warehouse. When a central warehouse is used for distribution, a higher level of inventory is considered necessary.

A substantial majority of U.S. respondents indicated a need to continue to decrease their inventory by improving their relationships with their suppliers, by decreasing the number of suppliers, and by finding new partnerships. However, the degree of need to decrease the number of suppliers was mentioned more significantly in 1998 responses. Stated differently, the hospitals seemed to be more satisfied with the number of suppliers compared to 1998. The largest reported need was in improvement in relationships with the suppliers.

4.2.3 Strategic Alliances

I review strategic alliances from four aspects. First, I want to know whether hospitals have considered medical collaborations in their practices. Second, I consider two types of logistics collaborations: vertical (just-in-time programs, stockless programs, EDI and supplier certification) and horizontal (purchasing, laundry service, food, and warehouse) and report how these two types of logistics collaborations have been implemented in U.S. hospitals. All these collaborations can reduce the need for additional staff, equipment, and/or medical supplies by reducing inefficiencies and by decreasing unused capacity. I will also report on outsourcing as a form of collaboration that reduces the hospitals' involvement in certain operations to a very insignificant level. In the last part of this section, I report hospitals' current and future plans for collaborations.

4.2.3.1 Medical collaboration

The sample shows a significant¹⁸ degree of medical collaboration between hospitals. Hospitals share medical staff, medical departments, and telemedicine. However, collaboration for telemedicine remains very weak (7.4% collaboration). The reported levels of collaboration in 1998 and 2005 are very close (e.g., medical staff collaboration was reported at an average of 23% and 22% in 1998 and 2005 respectively).

¹⁸ I use the word "significant" to indicate that the average responses is statistically and significantly different from "0."

4.2.3.2 Vertical logistics collaboration

A substantial majority of the respondents (87.6%) reported saving money because of their partnerships with vendors and implementing or improving their vertical collaborations. Among vertical collaborations (just-in-time, stockless programs, EDI, and supplier certification), JIT and EDI were reported at higher levels than the others. On average 24.91% and 39.18% reported JIT and EDI collaboration versus 13.7% and 18.4% for stockless programs and supplier certification. All these percentages, though mostly insignificant, are smaller than those reported in 1998. The only significant difference between reported averages in 1998 and 2005 is related to EDI. In 1998, U.S. respondents reported approximately 49% (vs. 39% in 2005) collaboration in EDI. It is possible that the decrease in the level of collaboration in EDI stems from an increase in outsourcing activities in more recent years (see below for further explanation).

4.2.3.3 Horizontal logistics collaboration

The largest level of horizontal collaboration is in purchasing and laundry (a reported average of 34.5% and 22.5% respectively). Collaboration in food and warehouse-sharing is reported in less than 10% of hospitals. Most hospitals still prefer to provide food service internally and do not want to share their warehouses¹⁹. Interestingly, almost all of the percentages have remained very close to those reported in 1998. The only significant difference was related to laundry services, which showed a substantial

¹⁹ It is possible that because of distances between hospitals, sharing warehouses is less possible for the majority of respondents.

increase in 2005. In 1998, only 8% of respondents reported collaboration in laundry services, whereas in 2005, this percentage increased to 22.5.

4.2.3.4 Outsourcing

Outsourcing was a very significant method of collaboration in 2005. As reported in Table 2, hospitals, similar to other businesses in the U.S., have entered more and more into outsourcing their operations. Table 2 compares the reported averages for outsourcing activities in the U.S. hospitals in 1998 and 2005. As the table indicates, the level of outsourcing increased significantly in the 7-year reporting period. It is possible that outsourcing has become a current practice in U.S hospitals.

**Table 2
Reported Outsourcing in the U.S.**

Activities	Averages 1998 %	Averages 2005 %
Linen	26.0	57.4
Food	6.3	23.8
Warehousing	8.6	4.4
Transportation	7.3	16.1
Logistics Information system	5.5	10.9

Note: Reported in percentage terms, in response to “what part of the following hospital activities are outsourced?”

4.2.3.5 Future of strategic alliances in the U.S.

Survey question 14 requested that respondents report their perception of what will happen within the next five years related to implementation of medical, vertical, and horizontal collaboration. I expected to see a high percentage of positive responses to all collaborative items, if the respondents believe that the level of current collaboration is low and/or if they have a process in place to increase the level of collaboration. My results indicate that on-average U.S. respondents did not believe that the level of collaboration would increase substantially in the future. I scaled the responses between 1 (very unlikely and unlikely to implement) and 3 (likely and very likely to implement). Table 3 reports the average responses to future implementations. As one can easily notice, the average of all responses, except for EDI is below 2, indicating that 2005 levels of collaboration are deemed appropriate and no additional increase in the levels is expected. Outsourcing increases have accompanied decreases in collaboration²⁰. Hospitals are not as interested in partnerships/alliances with others if they have considered or already outsourced certain services. My results provide strong evidence that hospitals prefer outsourcing their logistics functions to increasing collaboration with other hospitals/suppliers/vendors.

²⁰ It is very possible that because of legal issues with privacy, EDI continues to be considered an internal issue. Therefore, hospitals may prefer development of their own EDI and collaboration with other hospitals instead of outsourcing this logistics function.

Table 3
Future of Strategic Alliances in the U.S.
(Expected collaboration projects for the period 2005 to 2010)

Items reported	Reported Average*
Medical Departments	1.69
Medical staff	1.83
Telemedicine	1.79
Purchasing	1.81
Laundry sharing	1.55
Food services sharing	1.39
Warehouse sharing	1.42
Just-in-time programs	1.90
Stockless programs	1.79
E.D.I	2.36
Supplier certification	1.94

* Reported average by hospitals. Scaled to 1 to 3 (1 is the lowest expected level and 3 is the highest expected level of future collaboration).

4.3 French Results

4.3.1 Logistics Departments

Approximately 82 % of the French respondents reported having a logistics department, a substantial increase compared to the 31.4% reported in 1998. This increase is in-line with what was perceived as necessary by French hospitals in 1998, i.e. creation of specific logistics departments in hospitals.

The respondents reported that the logistics functions have the following responsibilities in French hospitals:

- Linen Service (89.9%)
- Food service (88.9%)
- Receiving (82.17%)
- Supplying (83.19%)
- Purchasing (81.27%)
- Internal distribution to medical departments (73.62%)
- Transportation (71.11%)
- Inventory management (69.79%)
- Management information system (44.4%)
- Maintenance and environment (38.14%)
- Home medical care (20.95%)
- Telemedicine (5%)

Similar to 1998, the logistics department is responsible for both direct and indirect support services. Linen and food services remain their most important responsibility. Overall, the logistics departments' responsibilities reported in 2005 were very similar to those reported in 1998. The major differences were related to "inventory management," "maintenance service," "telemedicine," (lower in 2005) and "home medical care," (higher in 2005). Based on these results, French hospitals have not considered increasing outsourcing of their management information systems (they reported the same level of

responsibility as in 1998).²¹ The high increase in the home medical care function in 2005²² can be explained by a recent requirement to increase this service in French hospitals. Telemedicine, with the steepest decline²³ in logistics responsibilities rankings, is not considered a very important part of the logistics department.

4.3.2 Medical Supplies

The average dollar value of inventory kept per bed in French hospitals is approximately \$2300, a drastic decrease since 1998.²⁴ There is a high level of awareness with respect to improving the distribution system in France. Respondents did not report a significant change in the number of suppliers for in recent years (defined as five) and mentioned that the majority of their inventory (57.2%) was held in their central warehouses. They also reported that medical supplies are mainly distributed via a central warehouse.²⁵ Overall, the level and amount of inventory in medical warehouses and delivered by suppliers to medical departments have decreased since 1998²⁶. The majority of French respondents report a need to further decrease in their medical supplies. They also believe the creation of new partnerships is a very important method for improving their distribution system and reducing inventory levels.

²¹ 44.14% reported MIS as the responsibility of a logistics department in 1998.

²² A 70.2% increase in 2005 compared to 1998.

²³ Telemedicine decreased by 61%.

²⁴ A significant number of respondents believe that the level of inventory has greatly decreased over the last 5 years.

²⁵ 72% of the inventory is distributed via a central warehouse, whereas 13.8% is directly delivered and 10.8 is distributed to medical warehouses.

²⁶ A 32% decrease compared to 1998.

4.3.3 Strategic Alliances

4.3.3.1 Medical collaboration

The French results show a significant degree of medical collaboration among hospitals with respect to the medical staff and departments, much more than their counterparts in the U.S. The collaboration for telemedicine is also much higher than was reported in the U.S. and shows a significant increase since 1998.²⁷

4.3.3.2 Vertical logistics collaboration

Compared to 1998, a majority of hospitals (69%) reported saving money because of improved partnerships with vendors and because of implementation and other improvements in their vertical collaborations (just-in-time, stockless programs, EDI, and supplier certification). The use of JIT remains very strong in French hospitals (34.9%). Supplier certifications and stockless programs are reported by 24.7% and 23.3% of respondents, respectively. The EDI collaboration is the weakest (18.9%), but has improved the most since 1998 (when only 2.6% had partnerships in EDI). Although data interchange is questionable because of privacy issues in France, the hospitals report the need to increase the level of electronic data interchange with their suppliers.

4.3.3.3 Horizontal logistics collaboration

Compared to 1998, French hospitals reported an increase in horizontal collaborations (partnerships with other hospitals in purchasing, laundry, food and

²⁷ 13.2 % for 2005, compared to 7.4% in 1998.

warehouse sharing). The highest level of collaboration was reported in purchasing and laundry sharing, 45.1% and 41.1% respectively. I also noted a very low level of collaboration for food services and warehouse sharing (both below 10%). Most hospitals still prefer to provide food service internally, which ensures that their quality standards are met. It is also possible that physical distances among hospitals make this collaboration in food service more difficult. Warehouse sharing (though not extensive) is reported more often in 2005 than in 1998.

4.3.3.4 Outsourcing

Outsourcing in French hospitals is not as important as it is in U.S hospitals. Table 4 compares the reported averages for outsourcing activities in French hospitals in 1998 and 2005. As the table indicates, the level of outsourcing has decreased in the 7-year reporting period. Laundry service is the only service which is still subcontracted (27.5%).

**Table 4
Reported Outsourcing in France**

Activities	Averages 1998 %	Averages 2005 %
Linen Service	38.2	27.5
Food	12.2	10.6
Warehouse	2.6	4.9
Transportation	32.6	18.5
Information System	24.5	13.8

Note: Reported in percentage terms, in response to “what part of the following hospital activities are outsourced?”

4.3.3.5 Future of strategic alliances in France

French respondents believe that the level of collaboration will increase substantially in the future. Table 5 shows that additional increases in collaboration are expected. Only in food service and warehouse sharing did respondents suggest that they do not see additional increases in the future. In the U.S., outsourcing increases have accompanied decreases in collaboration. Hospitals are more interested in partnerships/alliances with others when they do not consider outsourcing. Because French hospitals prefer development in collaborating with other hospitals instead of outsourcing, medical partnerships, purchasing and EDI will probably see major developments in the future.

Table 5
Future of Strategic Alliances in France
(Expected collaboration projects for the period 2005 to 2010)

Items reported	Reported Average
Medical Departments	2.64
Medical staff	2.61
Telemedicine	2.33
Purchasing	2.73
Laundry sharing	2.11
Food services sharing	1.72
Warehouse sharing	1.82
Just-in-time programs	2.40
Stockless programs	2.31
E.D.I	2.64
Supplier certification	2.38

* Reported average by hospitals. Scaled to 1 to 3 (1 is the lowest expected level and 3 is the highest expected level of future collaboration).

4.4 Comparative Analysis

4.4.1 Logistics maturity

Although French hospitals have witnessed an increase of over 150% in creation of logistics departments during recent years, the percentage of French hospitals with separate logistics departments is still less than that of U.S. hospitals.²⁸ The responsibilities of logistics departments in the two countries remain similar to those in 1998. Receiving is considered the most important logistics function in the U.S., whereas foodservice is logistics' number one function for French hospitals. Logistics departments in U.S. hospitals continue to be concerned with activities of direct support (such as receiving, distribution, supplying, purchasing, and inventory management), whereas their counterparts in France continue to be more concerned with indirect support activities (such as food and linen service) than direct support activities. Logistics departments in France are much more concerned with the management information system (44%) than their counterparts in the U.S. (29%). This is also true for home care service in French hospitals: 21% compared only 3.7% in U.S. hospitals. This trend can be explained by the significant increases in home care services provided by French hospitals. Such services are not normally provided by U.S. hospitals.

Panel A of Table 6 reports the comparison based on the responses received in 1998 whereas Panel B provides the same comparison for data collected in 2005. One significant movement in the French response in 2005 was in inventory management. The rank of "inventory management" fell from fourth in 1998 to eighth. This means that as

²⁸ In 2005, approximately 98% of U.S. hospitals reported having separate logistics departments. This number was approximately 82% for French hospitals.

the level of medical inventory in French hospitals decreased, “inventory management” was not considered as important as it had been previously. Telemedicine, as a function for the logistics department, is reported to be not important in both countries.

Table 6
A Comparison of Responsibilities Given to Logistics Services in the U.S. and France

Panel A: 1998

RESPONSIBILITY	UNITED STATES	FRANCE
	Receiving	Food services
	Internal distribution to medical departments	Laundry
	Purchasing	Physical supplying
	Inventory management	Receiving
	Physical supplying	Inventory management
	Laundry	Purchasing
	Management Information system	Internal distribution to medical departments
	Transportation	Transportation
	Maintenance/environmental services	Maintenance/environmental services
	Home care services	Management Information systems
	Food services	Home care services
	Telemedicine	Telemedicine

+
|
-

Panel B: 2005

RESPONSIBILITY	UNITED STATES	FRANCE
	Receiving	Food services
	Internal distribution to medical departments	Laundry
	Physical supplying	Physical supplying
	Purchasing	Purchasing
	Inventory management	Receiving
	Management Information system	Internal distribution to medical departments
	Linen Service	Transportation
	Transportation	Inventory management
	Maintenance/environmental services	Management Information system
	Food services	Maintenance/environmental services
	Home care services	Home care services
	Telemedicine	Telemedicine

+
|
-

Medical supplies are purchased and distributed differently in the two countries. The inventory system in U.S. hospitals is closer to a just-in-time system, while French hospitals prefer to use a central warehouse. Interestingly, French hospitals reported lower inventory per bed in 2005 (approximately \$2,300 per bed) compared to their U.S. counterparts (approximately \$5,400 per bed). Several reasons can contribute to this difference. For example, it is possible that the cost of medical supplies is lower in Europe than in the U.S. However, this reason cannot explain the fact that the amount of medical supplies in French hospitals was higher than that in the U.S. in the 1998 survey.

The only plausible explanation can be improvement in management of inventory in French hospitals. It seems that hospitals in France have been able to manage their supplies very effectively. It is likely that the urgency in reducing costs in French hospitals in the early 2000s was a significant factor in reduction of medical supplies inventory. More French respondents continue to suggest that they need to decrease their inventories (92.6%) than do U.S. respondents (74.3%). They also see more need to improve relationships with their suppliers and create new partnerships than do U.S. respondents (95.7% versus 76% and 91.2% versus 71.7% respectively).

Another noteworthy comparison is responses to two questions addressing whether “inventory has been reduced” and whether “the number of suppliers has been reduced.” The following comparison indicates how the perception of managers of logistics departments in the U.S. and French hospitals has changed from 1998 to 2005. It is very clear that the French hospitals are increasing their attention to medical supplies management.

Question/percentage of respondents	U.S.		France	
	1998	2005	1998	2005
Inventory has been reduced	83%	66%	46%	71%
Number of suppliers has been reduced	68%	70%	18%	81%

4.4.2 Comparison of collaboration, outsourcing and the future of strategic alliances

An analysis of French respondents shows that French hospitals continue to have a strong desire to improve their logistics activities through partnerships with suppliers and other hospitals. French hospitals intend to get involved in strategic alliances with others in purchasing, medical departments and staff, EDI, supplier certification, and JIT programs. On the other hand, U.S. hospitals show a strong desire to develop their alliances in EDI. It is important to note that U.S. hospitals use outsourcing more often than French hospitals.

4.5 Comparative analysis using indices

Similar to Aptel and Pourjalali (2001), I developed three indices: “Maturity of Logistics,” “Current Partnership,” and “Anticipated Partnership.” The first two indices report what the respondents believe about their current status in logistics functions and in

partnerships. The last index provides information on their expected future partnerships.

Below is more detailed information about these indices.

The “*Maturity of Logistics*” index is defined as the sum of the following items:

- **Extent of logistics department responsibility.** Answers to question number 2 (related to logistics department responsibilities) are aggregated and averaged.
- **The perception of logistics managers on how to improve distribution systems.** Answers to question 4 are aggregated and averaged.
- **The extent of logistics department improvement** during the last three years by reduction of medical supplies and number of suppliers. Answers to questions 7 and 8 are aggregated and averaged.

The “*Current Partnership*” index is defined as the sum of the following elements:

- **Medical Collaboration for Partnership Index.** An aggregate measure of collaboration in medical departments, medical staff, and telemedicine (the first three parts of question 10).
- **Collaboration on infrastructure for Partnership Index.** An aggregate measure of collaboration in laundry sharing, food services, and warehouse sharing (the last three parts of question 10).
- **Logistics Collaboration for Partnership Index.** An aggregate measure of collaboration in purchasing (part four of question 10), just-in-time programs, stockless programs, EDI, and supplier certification (question 11).
-

The definitions of the “*Anticipated Partnership*” index and the “Partnership” index are very similar. Answers to question 14, which are related to the hospital’s plans for the next five years, are used to calculate the related values.

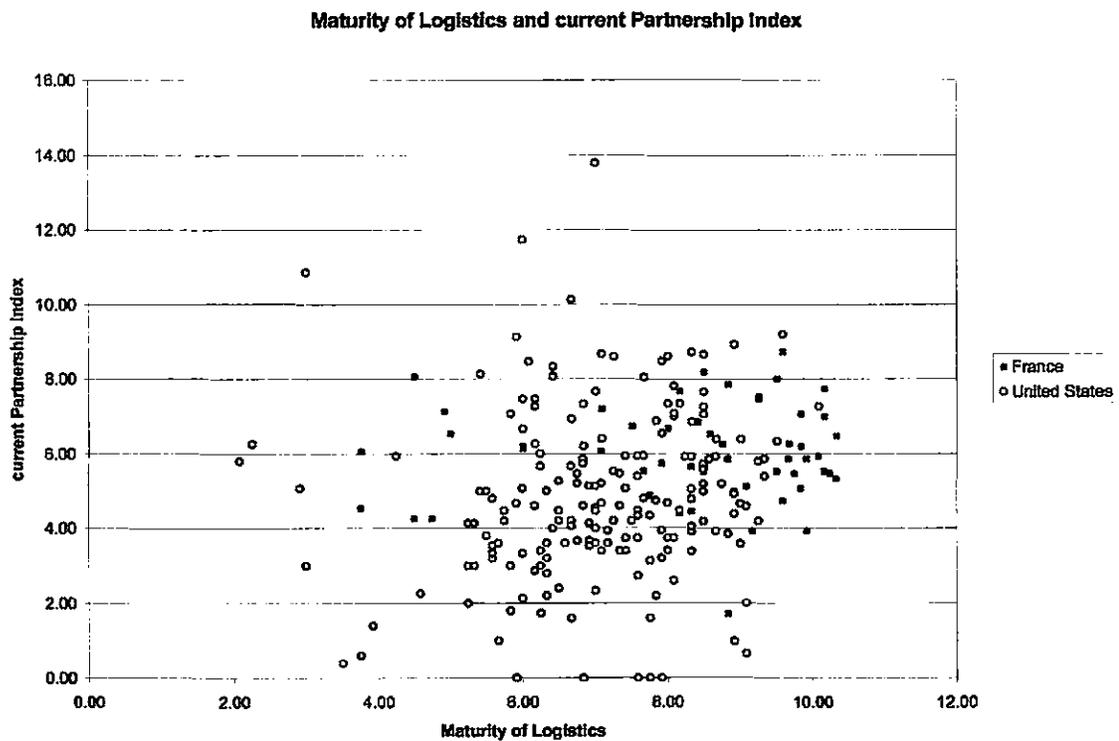
- **Medical Collaboration for Anticipated Partnership Index.** An aggregate measure of collaboration in medical departments, medical staff, and telemedicine (question 14).
- **Collaboration on infrastructure** An aggregate measure of collaboration in purchasing, laundry sharing, food services, and warehouse sharing (question 14).
- **Logistics Collaboration for Anticipated Partnership Index.** An aggregate measure of collaboration in purchasing, just-in-time programs, stockless programs, EDI, and supplier certification (question 14).

Table 7 provides the values for these indices for French and U.S. hospitals for years 1998 and 2005. In 1998, U.S. hospitals reported a much higher maturity in logistics and

partnership indices, where French respondents reported a much higher expected degree of partnerships for the future. The data from 2005 show that the French were successful in attaining this objective, as the maturity in logistics and partnership functions has increased substantially and is now higher in French hospitals than in the U.S. Figure 1 compares these relationships between French and U.S. hospitals in 2005.

Figure 1
Comparison of Relationship between French and U.S. Maturity of Logistics and Partnership Index in 2005

Note: Figure shows a higher French Maturity and Partnership index in 2005 compared to the U.S.



French hospitals continued to show a higher “anticipated partnership” index in 2005 compared to their U.S. counterparts, suggesting that they intend to continue to improve their logistics activities at a faster pace than do the U.S. hospitals. The extent of logistics department responsibilities in French hospitals has also increased substantially (1.34 in 1998 and 3.44 in 2005). This increase suggests that logistics departments and functions are becoming more centralized in France. This finding is in-line with the increase in the number of logistics departments reported by respondents.

Table 7

Comparison of the aggregate values for “Maturity of Logistics,” “Current Partnership,” and “Anticipated Partnership” Indices for U.S. and French Respondents, 1998-2005

	France		US	
	1998	2005	1998	2005
Maturity of Logistics:	5.93	8.32	8.27	7.06
Extent of logistics department responsibility	1.34	3.44	3.34	2.97
Logistics managers' perception of how to improve distribution system	2.44	2.6	2.26	2.14
Extent of logistics department improvement	2.06	2.27	2.67	1.96
Partnership Index:	5.25	6.06	5.4	4.82
Medical collaboration	1.56	1.79	1.72	1.43
Collaboration on Infrastructure	1.55	1.84	1.26	1.41
Logistics collaboration	2.14	2.43	2.43	1.99
Anticipated Partnership Index:	5.95	6.47	4.82	3.92
Medical collaboration	2.21	2.28	1.45	1.21
Collaboration on Infrastructure	1.53	1.82	1.39	1.17
Logistics collaboration	2.21	2.36	1.98	1.54

Notes:

Maturity of Logistics (calculated as the total of three items reported below):

Extent of logistics department responsibility. Answers to question number 2 (related to the logistics department responsibilities) are aggregated and averaged.

The perception of logistics managers on how to improve distribution systems. Answers to question 4 are aggregated and averaged.

The extent of logistics department improvement during the last three years by reduction of medical supplies and number of suppliers. Answers to questions 7 and 8 are aggregated and averaged.

Partnership Index (calculated as the total of three items reported below):

Medical Collaboration for Partnership Index. An aggregate measure of collaboration in medical departments, medical staff, and telemedicine (the first three parts of question 10).

Collaboration on Infrastructure for Partnership Index. An aggregate measure of collaboration in laundry sharing, food services, and warehouse sharing (the last three parts of question 10).

Logistics Collaboration for Partnership Index. An aggregate measure of collaboration in purchasing (part four of question 10), just-in-time programs, stockless programs, EDI, and supplier certification (question 11).

Anticipated Partnership Index (calculated as the total of three items reported below):

Medical Collaboration for Anticipated Partnership Index. An aggregate measure of collaboration in medical departments, medical staff, and telemedicine (question 14).

Collaboration on Infrastructure An aggregate measure of collaboration in purchasing, laundry sharing, food services, and warehouse sharing (question 14).

Logistics Collaboration for Anticipated Partnership Index. An aggregate measure of collaboration in purchasing, just-in-time programs, stockless programs, EDI, and supplier certification (question 14).

CHAPTER 5

Summary and Conclusion

The objective of this study was to present insights into hospitals' logistics functions in France and the United States in 2005. Using the results of a 1998 survey questionnaire, Aptel and Pourjalali (2001) reported that managers of logistics departments in the U.S. and France intended to improve their logistics to improve efficiency and reduce costs. The current study examined whether these reported efforts were successful. Table 8 contains a summary of responses with respect to:

- How medical supplies activities were currently handled
- How the management of medical supplies improved during the previous 7 years (1998-2005)
- Whether any strategic alliances exist (or existed) with other hospitals to reduce the costs of medical supplies
- Whether the hospital was planning to implement additional contemporary management systems in the near future

TABLE 8
Summary of responses to four topics for the U.S. and France

Questions	<i>How medical supplies activities are currently handled.</i>	<i>How the management of medical supplies has improved during the last 7 years (1998-2005)</i>	<i>Whether any strategic alliances exist (or existed) with other hospitals to reduce the costs of medical supplies.</i>	<i>Whether the hospital is planning to implement additional contemporary management systems in the near future</i>
US	<p><i>A) Medical Supplies</i></p> <ul style="list-style-type: none"> • Delivery to medical departments via a central warehouse (44.3%) • Semi direct delivery via medical department warehouse (37.8%) • Central warehouse, distribution center, medical department warehouse (31.6%) • Suppliers only rarely directly deliver inventory when needed (16%); but has increased by 35.6% compared to 1998 <p><i>B) Food Service</i></p> <ul style="list-style-type: none"> • Still provided mostly internally, slight increase compared to 1998 in use of outside suppliers (10.4%) 	<ul style="list-style-type: none"> • Slight increase in level-of-medical-supplies inventory • Slight decrease in suppliers • Decreases in partnerships in suppliers certifications; Stockless and Just-in-Time programs • Decrease in Electronic Data Interchange (EDI) programs; but major weight, followed by JIT 	<ul style="list-style-type: none"> • Less than 25% partnership with other hospitals (decreased by 15.1%) • Partnerships are concentrated in purchasing, medical staff, and laundry sharing (in order of level of partnership) • Laundry sharing increased by 160% • Hospitals increasingly sub-contract food service; transportation and laundry service, and IS 	<ul style="list-style-type: none"> • Decrease in intent to implement partnerships in medical departments (20.9%); in purchasing (18.6%); supplier certification (22.4%), EDI (15.6%), Medical Staff 11 % • Slight decrease in intent to implement just-in-time programs, warehouse sharing, food service and stockless programs.
FRANCE	<p><i>A) Medical Supplies</i></p> <ul style="list-style-type: none"> • Delivery to medical departments via a central warehouse - (majority - 71.9%) • All other methods decreased compared to 1998 <p><i>B) Food Service</i></p> <ul style="list-style-type: none"> • provided mostly internally, when externally -supplier certification is required 	<ul style="list-style-type: none"> • Reduction in level-of-medical-supplies inventory • Improved relationship with suppliers • Improved just-in-time programs (3.3%); and major weight in supplier partnerships • Major improvement in EDI programs with suppliers; but minority in importance • Improved stockless programs (19.8%) • Improved supplier certification Programs (8.8%) 	<ul style="list-style-type: none"> • Alliances among or between hospitals only in purchasing and laundry sharing (about 44.5%). • Large increase in warehouse sharing, but only minority in alliances in general • Some hospitals sub-contract laundry service, food service, and transportation, but overall decrease in outsourcing (IS: 44% decrease) 	<ul style="list-style-type: none"> • Increase to Initiate/extend partnership projects in the near future in Warehouse sharing (37.7%); EDI (12.7%); and JIT (10.9%) • Generally, still high intent to increase partnership programs

As can be seen in my summary and results section, I found a substantial and significant improvement in logistics functions in French hospitals from 1998 to 2005. I attribute this improvement to changes in the healthcare financing practices and regulations in France. For example, a higher emphasis on the role of co-payments, the success of the prospective payment system (increases from 10% to approximately 50% in 2005), and efforts to reduce costs in response to increased use of the DRG system have had a direct effect on French healthcare systems. Results of the survey in 2005 indicate that French hospitals want to continue to improve their logistics functions. Sources of financing could contribute to this goal, as French hospitals may receive higher funding if they show collaboration with other hospitals. Also, French hospitals are not as involved in outsourcing as their U.S. counterparts. When a function is outsourced (as is the reported case in the U.S.), the need for collaboration is removed.

U.S. hospitals, on the other hand, did not show much improvement in their logistics functions.²⁹ The U.S. healthcare system has not witnessed substantial changes since 1998. This may contribute to the lack of improvement in logistics functions in U.S. hospitals. My results did not change when I compared the logistics functions of the two countries using three different indices. Both the Partnership index and the Anticipated Partnership index showed higher levels of collaboration in French hospitals.

This research can be extended in at least two different aspects: by including and linking accounting data to logistics functions and by including new development in healthcare management such as what is now known as evidence-based best practice

²⁹ In some aspects they were less efficient, although not statistically significant.

(EBBP), one of the more recent undertakings in addressing the quality of healthcare. EBBP suggests that standardization may be used to reduce patients' treatment without affecting the quality of care. The method tries to define a general plan for diagnosis and treatment of a disease, including appropriate tests and treatments. But the question arises as to what extent can or should the work of physicians in various hospitals be standardized. Thibadoux et al. (2007) report that physicians' main concerns are related to the ethical dilemma that may result from using this method. When all concerns are considered, applying traditional, standard cost-accounting techniques to evidence-based medicine protocols will be relevant for healthcare providers as well as policy planners in the future. Standardization of medical costs is also a tool for budgeting and planning in health care institutions.

References

- American Hospital Association. Statistics and Fast Facts. 2007:
<http://www.aha.org/aha/resource-center/Statistics-and-Studies/fast-facts.html>,
accessed 9/20/2007.
- Aptel, O., and H. Pourjalali. 2001. Improving Activities and Decreasing Costs of Logistics in Hospitals, a Comparison of U.S. and French Hospitals, *International Journal of Accounting*, Vol. 36, Issue 1: 65-90.
- Armstrong, P. 2002. The Costs of Activity-Based Management, *Accounting, Organizations and Society*, Vol. 27, Issue 1/2: 99-120
- Bellanger M., and L. Tardif. 2006. Accounting and Reimbursement Schemes for Inpatient Care in France, *Health Care Management Science*, Vol. 9, Issue 3: 295-305
- Brickley, J. A., and R. L. Van Horne. 2002. Managerial Incentives in Nonprofit Organizations: Evidence from Hospitals, *Journal of Law and Economics* Vol. 45: 227-249
- Centers of Medicare and Medicaid Services. 2007. Office of the Actuary: Data from the National Health Statistics Group, NHE summary including share of GDP, 1960-2005.
http://www.cms.hhs.gov/NationalHealthExpendData/02_NationalHealthAccountsHistorical.asp, accessed 11/20/2007.
- Ciotti, V., and B. Pagnotta. 2005. The Other Side of Outsourcing. *Healthcare Financial Management*, Vol. 59, Issue 2: 38-41.
- Dranove, D. 1988. Pricing by Nonprofit Institutions: The Case of Hospital Cost Shifting. *Journal of Health Economics*, Vol. 7:47-57.
- Finkler, S. A., and D. M. Ward. 2003. The Case for the Use of Evidence-based Management Research for the Control of Hospital Costs, *Health Care Management Review*; Vol. 28, Issue 4: 348-365.
- Greenberg, W., and L. G. Goldberg. 2002. The Determinants of Hospital and HMO Vertically Integrated Delivery Systems in a Competitive Health Care Sector, *International Journal of Health Care Finance and Economics*, Vol. 2, Issue 1: 51-68

- Hill, N.T. 2000. Adoption of Costing Systems in US Hospitals: An Event History Analysis 1980–1990. *Journal of Accounting and Public Policy*, Vol. 19, Issue 1: 41–71.
- Kane, D. 2007. Strategies Emerge to Bring Supply Costs Down, *H&HN: Hospitals & Health Networks*, Vol. 81, Issue 8: 32-32
- Keeler, E. B., G. Melnick, and J. Zwanziger. 1999. The Changing Effects of Competition on Non-profit and For-profit Hospital Pricing Behavior. *Journal of Health Economics*, Vol. 18: 69-86.
- Krishnan, R. 2005. The Effect of Changes in Regulation and Competition on Firms' Demand for Accounting Information, *The Accounting Review*, Vol. 80, Issue 1: 269-287.
- Lawson, R. A. 2005. The Use of Activity-based Costing in the Healthcare Industry: 1994 vs. 2004, *Research in Healthcare Financial Management*; Vol. 10 Issue 1: 77-94.
- Lorence, D. P., and A. Spink. 2004. Healthcare Information Systems Outsourcing, *International Journal of Information Management*, Vol. 24, Issue 2:131-145.
- Maynard, A. 2005. European Health Policy Challenges, *Health Economics*, Vol. 14: 255-263.
- OECD Health Division. June 2007: <http://www.oecd.org/dataoecd/46/36/38979632.xls>, accessed 9/20/07
- Pizzini, M. J. 2006. The Relation between Cost-system Design, Managers' Evaluations of the Relevance and Usefulness of Cost Data, and Financial Performance: An Empirical Study of US Hospitals, *Accounting, Organizations and Society*, Vol. 31, Issue 2: 179-210.
- Schreyögg, J., T. Stargardt, O. Tiemann, and R. Busse. 2006. Methods to Determine Reimbursement Rates for Diagnosis Related Groups (DRG): A Comparison of Nine European Countries, *Health Care Management Science*, Vol. 9: 215-223.
- Shaffer, F. April 2007. A Buyer's Guide to Effective Management of External Staffing Companies, *Nurse Leader* , Vol. 5, Issue 2: 36-40
- Shinkman, R. September 2000. Outsourcing on the Upswing, *Modern Healthcare*: Vol. 30, Issue 37: 46-54.
- Thibadoux, G., M. Scheidt, and E. Luckey. 2007. Accounting and Medicine: An Exploratory Investigation into Physicians' Attitudes toward the Use of Standard Cost-accounting Methods in Medicine, *Journal of Business Ethics*, Vol. 75: 137-149.

Tierney, S. April 2004. Supply Chain Costs on the Mend at some European Health Authorities, *Supply Chain Europe*, Vol. 13, Issue 3: 16-18.

Udpa, S. 1996. Activity-based Costing for Hospitals, *Health Care Management Review*, Vol. 21, Issue 3: 82-96.

West , T., and D. West. February 1997. Applying ABC to Healthcare. *Management Accounting*: Vol. 78, Issue 8: 22-33

Appendix Questionnaire for Hospital's Logistics System

Please, complete this questionnaire as it relates to **your hospital**.

1- Does your hospital have a **materials management department, a purchasing department, or a logistics department?**

1o Yes

2o No (go to question #3)

2- Approximately, what **portion of the responsibility** for each of the following is **handled by this department ?**

	0%	1 to 25%	26 to 50%	51 to 75%	76 to 99%	100%	don't know
Purchasing	<input type="radio"/>						
Physical supplying	<input type="radio"/>						
Receiving	<input type="radio"/>						
Inventory management	<input type="radio"/>						
Internal distribution to medical departments	<input type="radio"/>						
Management Information Systems	<input type="radio"/>						
Telemedicine	<input type="radio"/>						
Food services	<input type="radio"/>						
Linen services	<input type="radio"/>						
Transportation	<input type="radio"/>						
Home care services	<input type="radio"/>						
Maintenance/environmental services	<input type="radio"/>						

3- In percentage terms, indicate the manner that medical supplies are distributed to the medical departments of your hospital :

	0%	1 to 25%	26 to 50%	51 to 75%	76 to 99%	100%	don't know
Supplies are directly delivered to our medical departments by vendors as needed	<input type="radio"/>						
Supplies are inventoried first in our medical department storages then used as needed	<input type="radio"/>						
Supplies are inventoried first in our central warehouse , then delivered by our distribution center directly to medical departments	<input type="radio"/>						
Supplies are inventoried first in our central warehouse , then delivered by our distribution center to medical department storages and finally used as needed	<input type="radio"/>						

4- What do you think is (are) needed to improve **your distribution system**:

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Don't know
we need to decrease inventories	<input type="radio"/>					
we need to reduce the number of our suppliers	<input type="radio"/>					
We need to improve relationships With our suppliers	<input type="radio"/>					
We need to create new partnerships with other hospitals	<input type="radio"/>					
Others (please specify).....	<input type="radio"/>					

5- Please estimate the total dollar value of the inventory kept in your hospital :

\$ _____

6- In percentage terms, how is that amount allocated among the following categories?

_____ % in a **Central Warehouse**

_____ % in a **Distribution Center**

_____ % in **Medical Departments**

_____ % in **other** locations (please explain:

_____)

Total 100 %

7- Compared to five years ago the total inventory kept in our hospital has:

- greatly decreased decreased stayed about the same increased
 greatly increased don't know

8- Compared to five years ago the total number of our vendors has:

- greatly decreased decreased stayed about the same increased
 greatly increased don't know

9- Does your hospital use telemedicine?

Yes

No

10- In percentage terms, please indicate the degree of strategic alliances¹ between your hospital and other hospitals in the following:

	0%	1 to 25%	26 to 50%	51 to 75%	76 to 99%	100%	don't know
Medical Departments	<input type="radio"/>						
Medical staff	<input type="radio"/>						
Telemedicine	<input type="radio"/>						
Purchasing	<input type="radio"/>						
Laundry sharing	<input type="radio"/>						
Food services sharing	<input type="radio"/>						
Warehouse sharing	<input type="radio"/>						
Others (please specify).....	<input type="radio"/>						

11- In percentage terms, please indicate the degree of partnerships² between your hospital and your vendors in the following:

	0%	1 to 25%	26 to 50%	51 to 75%	76 to 99%	100%	don't know
Just-in-time programs	<input type="radio"/>						
Stockless programs	<input type="radio"/>						
E.D.I. (Electronic Data Interchange)	<input type="radio"/>						
Supplier certification	<input type="radio"/>						
Others (please specify).....	<input type="radio"/>						

12- Compared to five years ago, would you say that your hospital saved money because of its partnerships with your vendors ?

- Yes No

¹ An agreement between two or more individuals or entities stating that the involved parties will act in a certain way in order to achieve a common goal. Strategic alliances usually make sense when the parties involved have complementary strengths

² A relationship of two or more entities conducting business for mutual benefit.

13- In percentage terms, what part of the following your hospital activities are **outsourced**?

	0%	1 to 25%	26 to 50%	51 to 75%	76 to 99%	100%	don't know
Linen	<input type="radio"/>						
Food	<input type="radio"/>						
Warehousing	<input type="radio"/>						
Transportation	<input type="radio"/>						
Logistics Information system	<input type="radio"/>						
Others (please specify).....	<input type="radio"/>						

14- **How likely** is your hospital to **implement** during the **next five years** each of the following **partnership projects** ?

	Very unlikely	Unlikely	Neutral	Likely	Very Likely	Don't know
Medical Departments	<input type="radio"/>					
Medical staff	<input type="radio"/>					
Telemedicine	<input type="radio"/>					
Purchasing	<input type="radio"/>					
Laundry sharing	<input type="radio"/>					
Food services sharing	<input type="radio"/>					
Warehouse sharing	<input type="radio"/>					
Just-in-Time programs	<input type="radio"/>					
Stockless programs	<input type="radio"/>					
EDI (Electronic Data Interchange)	<input type="radio"/>					
Supplier certification	<input type="radio"/>					
Others (please specify).....	<input type="radio"/>					

1- Number of beds: _____

2 – Type of hospital³: _____

Thank you very much for your help.

³ For example, private, public, teaching and research, research, clinic.