
Coevolution of Patients and Hospitals: How Changing Epidemiology and Technological Advances Create Challenges and Drive Organizational Innovation

Federico Lega, PhD, associate professor, Bocconi University and SDA–School of Management, Department of Policy Analysis and Public Management; and Stefano Calciolari, PhD, assistant professor, Università della Svizzera italiana

EXECUTIVE SUMMARY

Over the last 20 years, hospitals have revised their organizational structures in response to new environmental pressures. Today, demographic and epidemiologic trends and recent technological advances call for new strategies to cope with ultra-elderly frail patients characterized by chronic conditions, high-severity health problems, and complex social situations. The main areas of change surround new ways of managing emerging clusters of patients whose needs are not efficiently or effectively met within traditional hospital organizations.

Following the practitioner and academic literature, we first identify the most relevant clusters of new kinds of patients who represent an increasingly larger share of the hospital population in developed countries. Second, we propose a framework that synthesises the major organizational innovations adopted by successful organizations around the world. We conclude by substantiating the trends of and the reasoning behind the prospective pattern of hospital organizational development.

For more information on the concepts in this article, please contact Professor Calciolari at stefano.calciolari@usi.ch.

INTRODUCTION: TIME TO ENRICH THE FOCUS

Over the last 20 years, hospitals in developed countries have greatly altered their organizational structures in response to the pressures posed by financial, social, and technological challenges. Attention has been paid to improving (1) the management of assets and operations and (2) disease and risk management practices (McKee and Helay 2002; Porter and Teisberg 2006; IHF 2007; IHF 2008; Bohmer 2009; De Souza 2009). Both directions of change are necessary for the development of safe and efficient hospitals, but they are not sufficient if we consider the impact of current demographic and epidemiologic trends on hospital populations (Parker et al. 2006).

The population of Western developed countries is aging. The median age of the total European Union population is expected to increase from 40.4 to 47.9 years; the age group over 65 is forecasted to almost double in size between 2008 and 2060 (United Nations 2001; Giannakouris 2008). This aging of the population is associated with a higher prevalence of chronic diseases, a higher risk of polymorbidities and adverse outcomes (Anderson and Hussey 2000), and an increased use of long-term care facilities (Coyte et al. 2008). Several studies highlight that hospitals are increasingly facing ultra-elderly frail patients characterized by chronic conditions, high-severity health problems, and complex social situations (Townsend et al. 1988; Wan et al. 2002; Leichsenring 2004; Rechel et al. 2009).

Under the pressure of these changes, hospital management has searched

for guiding ideas and conceptual frameworks (Helay and McKee 2002). However, the literature shows a gap in the evolution and redesign of modern hospitals due to epidemiologic and technological trends (Lega 2008; Neogy and Kirkpatrick 2009). Several challenges are emerging as a consequence of these trends.

1. **The management of frail frequent users**, patients with multiple chronic illnesses who are frequently readmitted. Their situations call for better-orchestrated services in which hospitals mediate this new complexity (Clarfield et al. 2001).
2. **The management of “quasi-unstable” patients** characterized by a high severity of illness and deteriorating health conditions. These patients require a level of care intensity and surveillance between those of a traditional ward and an intensive care unit (Iapichino et al. 2000; Iapichino et al. 2005b; Wild and Narath 2005; Boots 2009).
3. **The development of a post-acute care setting and quick rehabilitation tracks**, as the timing of rehabilitation may significantly affect health recovery and clinical outcomes, especially with elderly patients (Rollow et al. 2006).
4. **The development of stable medical guidance** for pre- and post-surgical patients with critical health conditions, such as orthogeriatric patients or patients with evolving symptoms (Parker et al. 2006).
5. **The need for collaboration among specialists** to reduce or cope with

turf war issues posed by new therapeutic alternatives, innovative medical technologies, and patient complexity, as in the areas of cardiovascular disease, neuroscience, or oncology (Huckman and Pisano 2005; Levin et al. 2005). This collaboration calls for intermediate organization levels, such as divisions and departments, to enhance clinical governance among specialties (Braithwaite and Westbrook 2004; Dunnion and Dunne 2004; Lega 2004; Lega and DePietro 2005; Lega 2008).

In this work, we aim to fill in some of the gaps in the literature, thus providing scholars and practitioners with useful food for thought. We first illustrate the evolutionary path and features of main emerging clusters of hospital patients; second, we discuss a framework that conceptualizes how hospitals can organizationally coevolve with patients' needs and new technical possibilities. We draw relevant examples of this coevolution from a comprehensive¹ review of pilot experiences in different health systems: similar developments are occurring in many contexts, such as the United Kingdom, Germany, United States, Spain, Italy, Australia, and southeast Asia (Villa et al. 2009; Mazzocato et al. 2010).² Finally, we discuss the lessons learned and the managerial implications of the expected evolutionary pattern of hospitals.

SEVERITY, INSTABILITY AND NEGLECTED COMPLEXITY

Hospital users' age and severity of illness have increased over the last 20 years,

partially because community-based alternatives can effectively manage the demand of inpatient hospital care for older people (Parker et al. 2006). As a result, new clusters of patients are emerging. They represent significant epidemiological drivers for reorganizing hospital cure and care. Based on the results of several studies investigating this phenomenon from different perspectives (Hogan et al. 2003; Wilkinson 2007; Jencks et al. 2009), we hereafter propose an in-depth discussion about the three most important consolidating clusters of patients: frail patients, high-dependency patients, and patients in need of early rehabilitation and post-acute care. Obviously, a single patient might belong to more than one cluster, for instance, an elderly patient with a hip fracture, cardiac decompensation, and a very complex cardiovascular or respiratory clinical situation.

Frail Patients

Despite the lack of consensus on a common definition (Rockwood 2005), "frail patients" are usually identified as elderly patients with complex health conditions—multiple chronic diseases, cognitive disorders, or often simple lack of self-sufficiency (Inouye et al. 1999). During hospitalizations they require specific attention to their global health status rather than just a focus on the reasons for admission. Jencks and colleagues (2009) showed that, in the United States, almost one-fifth of the Medicare beneficiaries discharged from a hospital are rehospitalized within 30 days, and in 70.5 percent of the cases for a medical condition (not for a surgical complication or relapse). Several of

these readmitted patients were mismanaged frail patients, as Medicare patients are often frail and require holistic treatment (spanning from medicine management to health education). Modern therapies are often designed for pure patients, who do not account for as high a percentage of the attended as they once did. Proper care for frail patients is important for health reasons—their clinical situation inevitably worsens each time they develop a new acute episode requiring hospital readmission—and for reasons of efficiency—the economic burden of their readmission is high, due to clinical aggravation (Landefeld et al. 1995; Asplund et al. 2000; Parker et al. 2002). Several examples show new hospital strategies aimed at dealing with frail patients; for instance, collaborative processes based on case management where a multidisciplinary team headed by a case manager tailors, plans, and implements care in both the acute and the post-acute phase (Lim et al. 2003; Leichsenring 2004; Damiani et al. 2009). However, a selective focus on the acute problem of hospitals' organization and management practices does not usually fit with the aforementioned developments in hospital population (Hogan et al. 2003; Wilkinson 2007).

High-Dependency Patients

A study of the UK Department of Health (NHS 1999) identified four categories of patients clustered by severity (i.e., medical instability) and, as a consequence, with different needs. Hospitals have complemented the normal care with intensive care and, more recently, with day hospitals, day surgery, and day service. However, the challenge

currently consists of introducing a “high-care” area in which surgical or medical patients characterized by high severity, who require more support than that provided by usual care, can be treated without the help of an intensive care unit. Because some evidence points to inappropriate uses of intensive care (Jennett 1984; Donnelly et al. 1995; Iapichino et al. 2000; Iapichino et al. 2005a; Iapichino et al. 2005b; Wild and Narath 2005; Chess et al. 2007), high-care areas might be a fitting solution for high-dependency patients. This area should be multidisciplinary and assist patients coming from different disciplines. The discriminating factor is the level of care required rather than the medical conditions involved.

Patients in Need of Early Rehabilitation and Post-Acute Care

Controlled studies show that a better focus on post-acute care delivered in hospitals and better management of discharges tend to reduce both length of stay and rehospitalization rates. A clear example of the need for better discharge management is given by the emergence of roles such as the hospitalist in the United States. Hospitalists are expected to coordinate better care for hospitalized patients and to communicate with primary care physicians to improve discharge practices (Brown 2006; Tulloch et al. 2007; Friedman et al. 2008; Saravanakumar et al. 2008). Further, such a focus promotes quicker bed turnover, better allocation of resources, and more balanced staffing within the hospital, differentiating normal acute care wards from post-acute wards in which patients complete their stay before discharge and

where they can start a focused rehabilitation program (Visser and Beech 2005).

A FRAMEWORK FOR ORGANIZATIONAL INNOVATION IN HOSPITALS

Given the changes in the epidemiology of patients and the concurrent advances in technology, hospitals are seeking innovative organizational approaches. To some extent, this trend resembles an evolution of the progressive-care approach first developed in the 1960s (Lockward et al. 1960; US Public Health Service 1962). From another viewpoint, it is completely new: The change driver is no longer just the severity of the illness, but rather each patient's multiple, diversified care needs.

Working from this perspective, many hospitals are interested in a new organizational paradigm called the care-focused organization. This system aims to reshape hospital care delivery processes around the needs of patients and away from the traditional physician-centred view (Visser 1998; McKee and Helay 2002). It also works to move hospital organization beyond the professional bureaucracy archetype characterized by staff hyperspecialization, inefficiencies due to narrow functional areas and professional demarcations, and waste of resources from poor communication among departments and disciplines (Lega and DePietro 2005; Porter and Teisberg 2006; Bohmer 2009).

In the new organizational paradigm, the focus on the blend of severity and complexity promotes a hospital organized around the "intensity of cure and

care" when designing wards (Helay and McKee 2002). This concept is still undefined and open to several interpretations; different professionals—doctors, nurses, managers—tend to adopt divergent views according to their group and disciplinary interests.

Drawing from the concept of progressive care and from the literature on the evolving hospital patient, we propose the following definition of intensity of care: intensity refers to the variable level of care required according to clinical instability (due to modifications in vital parameters) and to care complexity (due to disease-related procedures or patient health and social status such as dependency, reduced cognitive capacity, etc.).³ The modern hospital is expected to shape its organization according to the changing intensity of care required by the emerging cohorts of patients.

In this perspective, theory and practice seem to converge around the following most recent and significant organizational innovations.

Frail Patient Wards

Frail patient wards admit elderly patients with multiple chronic diseases who need careful management of their many prescriptions and intensive tutoring at discharge (specific risk assessment screening tools, such as the Brass index, could support discharge planning) or in the post-acute inpatient phase. Patients might be triaged in the emergency room or transferred by other specialist wards. The frail patient ward is multidisciplinary, as its patients have problems that range from respiratory diseases to nephrologic, gastroenteric, and cardiac

diseases. The aim is to avoid what Zajac (2003) described as a disturbing lack of coordination between the number of specialists involved when a patient shows a complex medical problem. According to Stuart and colleagues (2006), an appropriate physical environment includes the provision of safe flooring, safe wandering space, orientation cues, and aids to mobility and self-care.

High-Care/High-Dependency Wards

A high-dependency ward (HDW) is dedicated to the high-dependency patients—post-surgical or medical—whose conditions are critical, but not so critical as to require intensive care support, and who require 24/7 supervision with a high intensity of care. Patients are admitted to an HDW for the first 24 hours after a surgical intervention and can stay there longer if they require medical supervision. Although they are not unstable or critical patients, people in HDWs need more instruction than normal care patients. However, due to shortages in nursing staffs, unprepared staffs, or a lack of beds equipped with monitors, high-dependency patients are often inappropriately hosted by intensive care units (Pirret 2002): for instance, patients with chronic ventilatory failure are high dependency but do not require intensive respiratory monitoring and therapy (Bone and Balk 1988). This misplacement causes two main problems: a shortage of intensive care beds and increased treatment costs. However, if patients are hosted in normal care wards, they risk a mismanagement of their care needs, and if their clinical conditions worsen, they might

become true intensive care patients (Armstrong et al. 2003; Tulloch et al. 2007; Saravanakumar et al. 2008).

Recovery Rooms

Evidence indicates that complications tend to emerge within three hours after intervention (Zuch 1995; Leykin et al. 2001). Therefore, a complement or an alternative to a specific high-care area could be a recovery room equipped with high-dependency beds to work as a high-care zone, but where patients can be kept under surveillance for up to five hours after a surgical intervention. Examples abound in northern European hospitals. Studies conducted in the UK National Health Service showed that the rotation of recovery-room staff to the HDW resulted in the staff gaining skill and confidence (Brown 2006). Though some organizational issues needed attention, this solution led to an increase in available HDW-level beds.

Medical Week Hospitals

Subjects admitted to medical week hospitals are elective medical patients who do not need to stay in the hospital for more than five days. Patients of this medical ward come almost entirely from the emergency department (ED). Though EDs' patient flow historically was regarded as unpredictable, in reality ED flow is to a large degree statistically predictable, and a portion of those patients, either deferred urgency patients or planned medical patients, can be treated in a medical week hospital if they (1) are clinically stable; (2) need to undergo a sequence of diagnostic tests that can be carried out within a period of five days; (3) show general symptoms

such as asthenia, weight loss, or anorexia; or (4) present altered exams. Various medical specialists are entitled to demand a bed in this area: primary care physicians and hospitalists, week hospital physicians, emergency department personnel, and specialists working either inside or outside the hospital. A successful illustration is Flinders Medical Centre in Australia (Sincock and Szwarcbord 2008). Some of the patients initially treated in the frail patient ward might benefit from planned admission to the week hospital for routine check-ups. This approach might decrease the frequency and intensity of undesired rehospitalizations associated with this cohort of patients. In addition, a medical week hospital might focus on improving the efficiency of weekly processes, thus saving resources during the weekends—especially nursing staff shifts—which might be an interesting positive external effect if the hospital is suffering from a healthcare staff shortage.

Post-Acute and Rehabilitation Fast-Track Wards

A frequent change in hospitals' organization is the creation of a post-acute and rehabilitation fast-track wards. These wards, usually managed by nursing staffs in collaboration with physiotherapists and geriatricians, are dedicated to patients, often elderly, who are engaged in early rehabilitation and kept under strict medical surveillance because of their complex clinical situation. For instance, in emerging pilot-project orthogeriatric wards, elderly patients with hip replacements are quickly moved to rehabilitation while the

geriatrician stabilizes the post-surgical clinical picture (Friedman et al. 2008).

Flexible Usual-Care Wards

To better cope with the differing intensity of care that ultra-elderly, non-self-sufficient, and frail patients require, hospitals are increasingly exploring new ways to allocate nurses and healthcare assistants/medical assistants. One option is to make the normal-care wards more flexible through a scoring system that measures the complexity of patients admitted and allows the hospital to redefine the presence and mix of nurses and healthcare assistants among different wards on a weekly basis. Moreover, in large medical departments, it is possible to identify specific areas that contain concentrated clusters of patients with different acute episodes but similar care or organizational needs, such as people with cognitive disorders or mobility issues or those "off the floor" (i.e., often in and out of the ward due to diagnostic examinations).

Discharge Room

The discharge room (DR) is a functional area, usually next to the emergency department, dedicated to discharged patients who are waiting for transportation to go home. A DR is staffed with paramedic personnel and provides hospital beds, nursing care, comfortable chairs, TVs, magazines, newspapers, meals, and drug administration when required. DR personnel contact relatives and alert ambulances for ordinary discharges. Patients reach ambulances or their relatives' cars with the assistance of paramedics who steward them through a protected, enclosed arrival port where

cars and ambulances can enter and pick up patients to avoid exposing them to the outside climate. As soon as inpatients are discharged and leave their hospital beds, the bed tracking system is activated, triggering prompt cleaning of the room and admission of new patients. From this perspective, the DR enhances the discharge process of frail patients or other hospitalized patients who require specific transportation and is an interesting solution to the overcrowding issue in emergency departments, given the increasing turnover rate of beds. Further, the DR can be used not only for patients discharged from medical wards, but also for those discharged from the emergency department after completion of a medical assessment (Jaklevic 2002; Cocker et al. 2005; Takakuwa et al. 2007; Tomassini et al. 2008).

Step-Down Units

Step-down units allow older people a comfortable period of time to recover after an acute episode. A step-down can be a kind of social care unit, a medium-term recovery area similar to a nursing home, where patients can fully recover before moving home. In some cases, this ward might be managed directly by general practitioners, as in community hospitals developed within general hospitals (UK Department of Health and Social Security 1974; Ramaiah 1994).

Patient Hotels

Patient hotels are facilities where patients can be transferred out of hospital beds to complete their convalescence. Some patients currently admitted to traditional wards are too healthy to be

hospitalized but too ill to stay at home or need to be hospitalized nonmedical reasons (e.g., social reasons related to age, distance from the closest hospital, etc.). In 1992, the UK Audit Commission estimated that almost one-third of medical beds may be superfluous and that 5 to 15 percent of patients may be suitable for a patient hotel (Davies 1990). Harvey and colleagues (1993) showed that in an 850-bed hospital, 98 patients could be transferred to a patient hotel, representing an annual savings of £2.7 million (about \$4.7 million US). Patient hotels, which have existed for several years in Sweden and the United States, are typically adjacent to acute hospitals. They provide high-quality accommodation for mobile patients who can care for themselves and control their own medications. At these hotels, patients can be more self-sufficient but still have ready access to professional care or assistance. Patients must go to the hospital for almost all medical and nursing interventions, although qualified nurses are often employed as hotel receptionists (Davies 1990).

Hospital-at-Home Units

Frequent physician visits and comprehensive geriatric assessment at patients' homes have been demonstrated to substantially reduce in hospital readmissions for different types of patients (Aimonino Ricauda et al. 2008). Patients treated by hospital-at-home units remain under the responsibility of the hospitals but enjoy their familiar environment as the care context. According to Leff (2009), the key features of a hospital-at-home unit are usually (1) a substitutive model providing

hospital-level care for patients living in a specified geographic catchment area delineated by 30-minute travel time; (2) eligible patients with acute illnesses that require hospital-level care who also meet previously validated medical eligibility criteria; (3) robust input from physicians (visits at least once a day and 24-hour coverage) and nurses (initial continuous nursing care followed by intermittent visits and 24-hour coverage); (4) retained inpatient status and responsibility for the acute care episode assumed by the hospital or health system; and (5) care provided in a coordinated manner similar to that in an inpatient ward. Shepperd and colleagues (2009) recently conducted a systematic review and meta-analysis restricted to admission-avoidance of hospital-at-home models.⁴ The main findings were a statistically significant reduction of mortality at the six-month follow-up, greater patient satisfaction with care, and lower rates of complications and lower costs, all without a statistically significant increase in hospital readmissions at three months.

Exhibit 1 shows how hospital organization, operations, and asset management might evolve by introducing the aforementioned innovations. It represents a comprehensive framework of the portfolio of the most diffuse innovation choices.

IMPLICATIONS FOR RESEARCHERS, POLICY MAKERS, AND MANAGERS

The framework discussed in this article applies to hospitals facing significant pressure to make internal changes because of the epidemiological evolu-

tion of patients and new technical and technological developments. Three specifications are required to assess the theoretical perspectives and limits of this work.

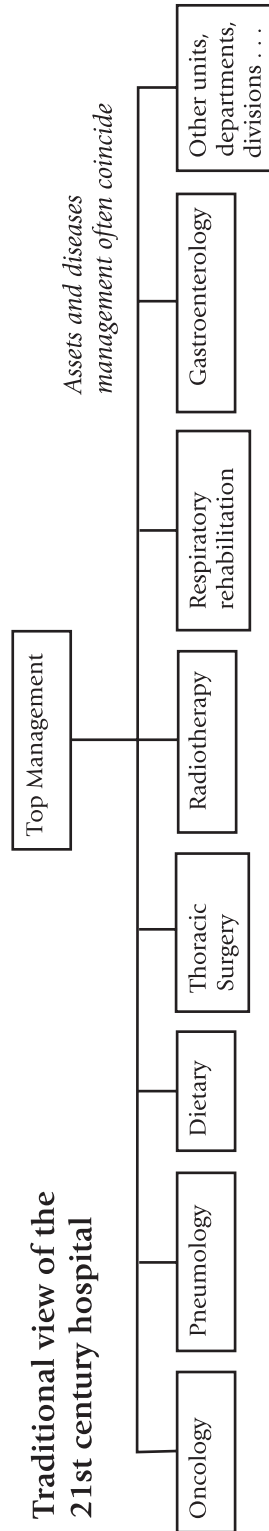
First, this work is not based on a meta-analysis or systematic review of the literature on hospital redesign. However, our literature review indicated that many innovations have been discussed not in the scientific literature—where it is evident that a gap exists between what is being studied and what is being done in the field—but rather in practitioners' journals. Therefore, our framework is drawn from critical cases showing significant consistency across several developed countries.

Second, there exist forces other than the patients' epidemiology and technological advances that call for a change. For example, financial and social pressures are presumably the next two most important forces for change. The introduction of day service, day surgery, week hospitals, patient hotels, and hospital-at-home units has been largely shaped by financial convenience. Frail-patient wards, step-down units, and flexible normal-care wards have also been pushed by patients' advocates (such as patient associations) and by isomorphic processes toward international or national directives or gold standards. Exhibit 2 graphically synthesizes the main forces in place and the focus of our work.

Third, the feasibility of changes varies across different settings and contexts. Hospitals that are part of integrated delivery systems may develop more easily in some areas, while a freestanding hospital operating in a

EXHIBIT 1
A New Vision for the Modern Hospital

**Traditional view of the
21st century hospital**



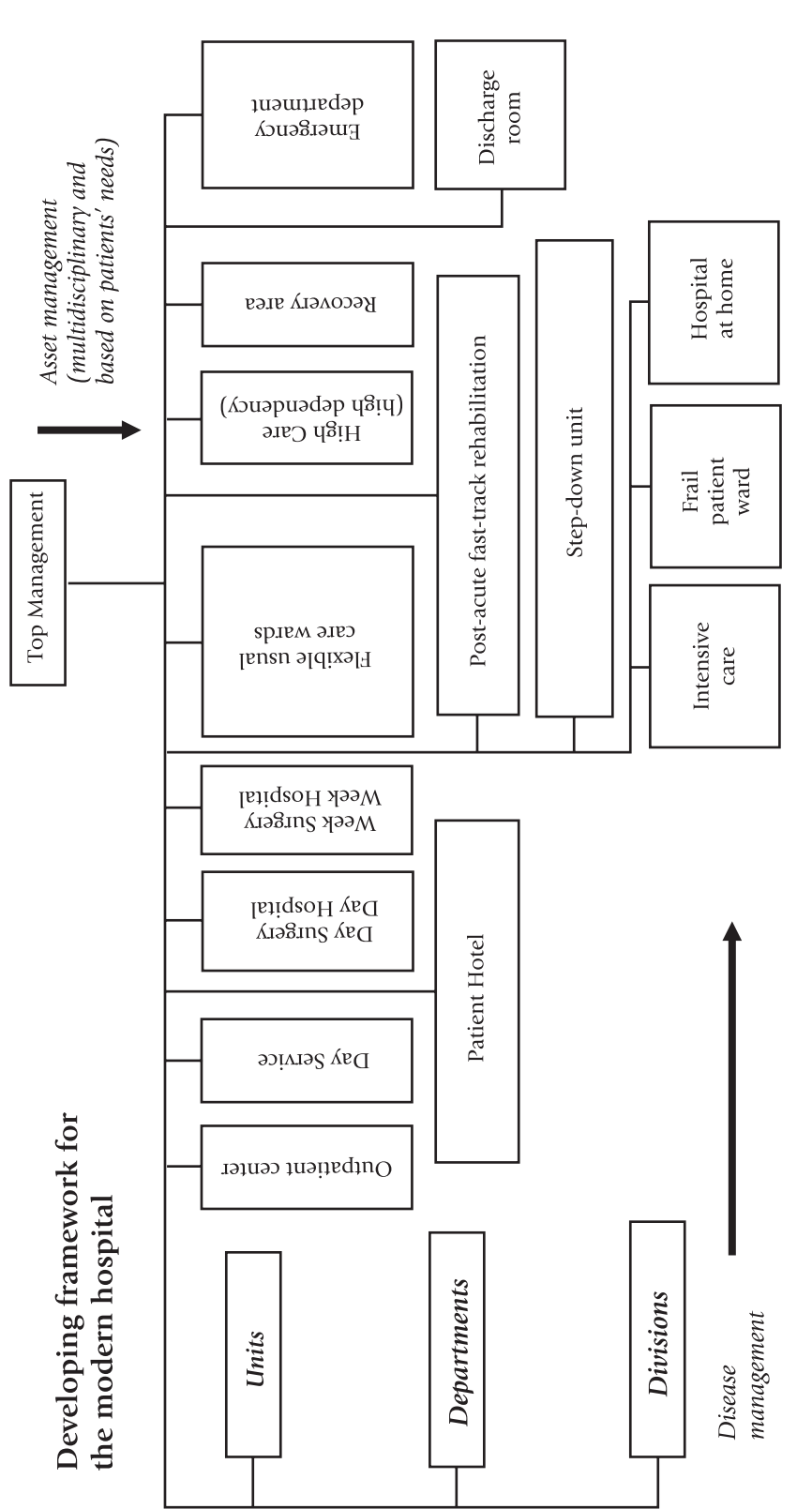
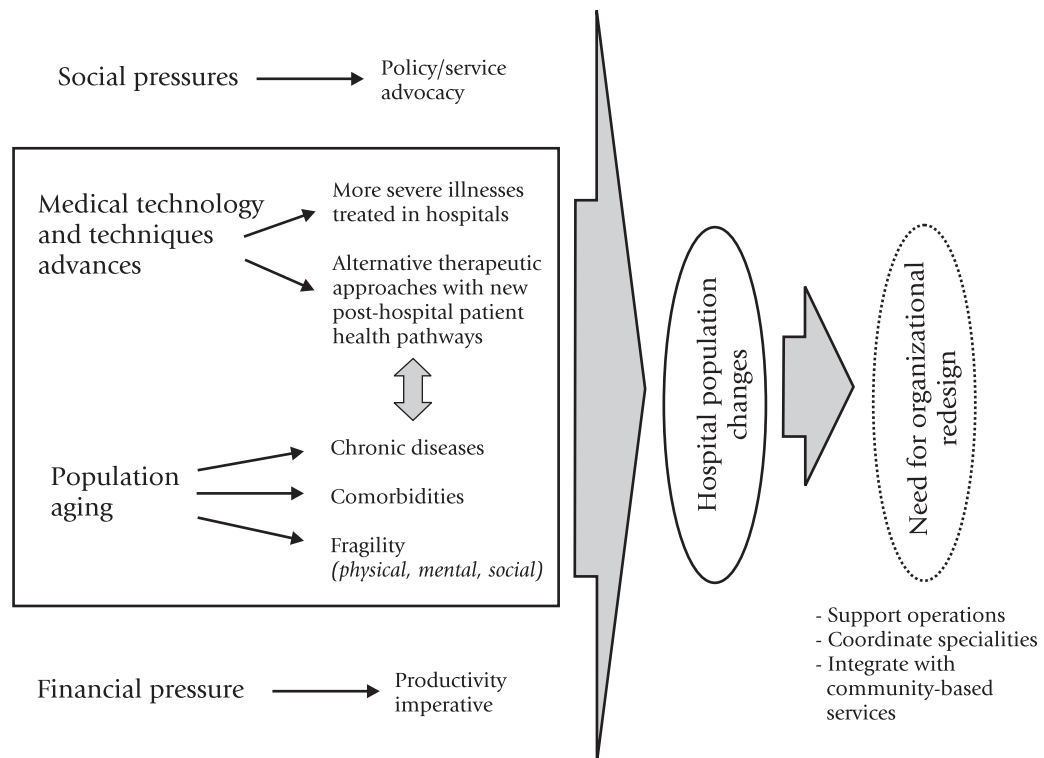


EXHIBIT 2
Main Factors Pushing Hospital Organization Changes



highly competitive environment could focus on other choices. Being part of a National Health Service- or Bismarck-like health system makes a strong difference. This work was not intended to explore feasibility, but simply to present a comprehensive framework to incite new thinking in practitioners and policy makers and set new directions for further research. However, as far as resistance to change is concerned, we encountered several recommendations in the literature while studying these cases, and one of them is worth discussion here. The most diffused resistance was discovered in hospital physicians. They fear losing control over

resources, because traditionally they have been able to operate with absolute discretion over resources given by the hospital administration. A change toward multidisciplinary work, sharing or pooling of resources, and nursing staff control over wards is culturally and operationally complex. Given our personal experience on the shop floor of several hospitals, we agree with this observation in the literature. However, we expect the forecasted shortage of hospital specialists (Mintzberg 1983; Leff 2009) to have a scaling-up effect on the pace of changes. As the shortage of nurses in recent years has already accelerated several changes in hospitals,

the shortage of physicians will similarly create a means for further changes.

Despite an abundance of indicators, there is scarce evidence that shows the true benefits of the described changes on patient outcomes, cost savings, productivity enhancements, or service integration. How can we insist that physicians act only on evidence in their practices and not hold organizational choices to the same standard? What we know is not enough, and what we should know must be a priority for a new stream of research.

We now have several pilot studies that can be investigated to provide those findings necessary to start an open-minded dialogue with physicians about the future of management and design of hospitals.

There are several directions for future research: We need to know the impact of these proposed changes, when they do and do not work as expected, and how implementation can be successfully managed. Although this issue has been discussed for more than 15 years, the rising debate in literature and the consolidated work done in several hospitals in different countries show that, perhaps, the time is now ripe for this research.

NOTES

1. We performed a systematic search in the titles and abstracts of PubMed, Web of Science, and Medline for the period of January 1995 to January 2010. We used the keywords *frailty*, *frail patient*, *elderly*, *hospital management*, *hospital organization*, *epidemiologic and demographic trends*, *discharge management*, and *ward organization*. We then analyzed the abstracts of the retrieved articles and selected only relevant

contributions for further analysis; we included additional relevant contributions identified in the references of the selected articles.

2. Many of the experiences are reported in gray literature, as there is still a lack of academic studies that investigated these changes in hospitals and their outcomes. However, the closest body of literature refers to the idea of patient-focused or patient-centred hospitals, and comprehensive reviews can be found in Helay and McKee (2002), Lega and De Pietro (2005), and Rechel and colleagues (2009). Among the several cases investigated in this work we included the following: Alzira Hospital and Hospital del Mar in Barcelona (Spain), Coxa Hospital in Tampere (Finland), Capiro Norway in Oslo and St. Olav's Hospital in Trondheim (Norway), Rotterdam Medical Center, Martini Teaching Hospital in Groningen, and Orbis Medical Park Sittard (Netherlands), Karolinska University Hospital in Stockholm (Sweden), Istituto Clinico Humanitas in Milan and the six hospitals of the local health unit of Florence (Italy), Bumungrad hospital in Bangkok (Thailand), Hopital de Pontoise (France), Rhön-Klinikum Group (Germany), and Flinders Medical Centre in South Australia (Australia).
3. Since 2005 at least two Italian regions, Tuscany and Umbria, have adopted a similar definition regarding the development of intense care hospitals in normative acts (Regional Health Plan and annexes).
4. The analysis included ten randomized controlled trials, five of which had patient-level data. All of the included studies were conducted in countries with a single-payer health system model: Australia, New Zealand, the United Kingdom, and Italy.

REFERENCES

Aimonino Ricauda, N., V. Tibaldi, B. Leff, C. Scarafioti, R. Marinello, M. Zanicchi,

- and M. Molaschi. 2008. "Substitutive 'Hospital at Home' Versus Inpatient Care for Elderly Patients with Exacerbations of Chronic Obstructive Pulmonary Disease: A Prospective Randomized, Controlled Trial." *Journal of the American Geriatrics Society* 56 (3): 493–500.
- Anderson, G. F., and P. S. Hussey. 2000. "Population Aging: A Comparison Among Industrialized Countries." *Health Affairs* 19 (3): 191–203.
- Armstrong, K., J. Young, A. Hayburn, B. Irish, and S. Nikolett. 2003. "Evaluating the Impact of a New High Dependency Unit." *International Journal of Nursing Practice* 9 (5): 285–293.
- Asplund, K., Y. Gustafson, C. Jacobsson, G. Bucht, A. Wahlin, J. Peterson, J. O. Blom, and K. A. Angquist. 2000. "Geriatric-Based Versus General Wards for Older Acute Medical Patients: A Randomized Comparison of Outcomes and Use of Resources." *Journal of the American Geriatric Society* 48 (11): 1381–88.
- Bohmer, R. M. J. 2009. *Designing Care: Aligning the Nature and Management of Health Care*. Boston: Harvard Business Press.
- Bone, R. C., and R. A. Balk. 1988. "Noninvasive Respiratory Care Unit: A Cost Effective Solution for the Future." *Chest* 93 (2): 390–394.
- Boots, R. J. 2009. "When Is It Time to Go? The Difficulty of Intensive Care Unit Discharge Decisions at Times of High Census or Admission Demand." *Critical Care Medicine* 37 (11): 2982–83.
- Braithwaite, J. and M. Westbrook. 2004. "A Survey of Staff Attitudes and Comparative Managerial and Non-Managerial Views in a Clinical Directorate." *Health Services Management Research* 17 (3): 141–166.
- Brown, A. 2006. "Redesigning Patient Services." *Nursing Management* 13 (2): 26–30.
- Chess, D., M. Krentzman, and J. Charde. 2007. "Creating a Wellness Program/Safety Net for the Medically Complex and Frail Patient." *Journal of Ambulatory Care Management* 30 (1): 30–38.
- Clarfield, M. A., H. Bergman, and R. Kane. 2001. "Fragmentation of Care for Frail Older People—An International Problem. Experience from Three Countries: Israel, Canada, and the United States." *Journal of the American Geriatrics Society* 49 (12): 1714–21.
- Cocker, T., S. Mason, J. Wardrope, and S. Walters. 2005. "Targets and Moving Goal Posts: Changes in Waiting Times in a UK Emergency Department." *Emergency Medicine Journal* 22 (10): 710–714.
- Coyte, P., N. Goodwin, and A. Laporte. 2008. *Policy Brief: How Can the Settings Used to Provide Care to Older People be Balanced?* Copenhagen: WHO Regional Office for Europe.
- Damiani, G., B. Federico, A. Venditti, L. Sicuro, A. Rinaldi, F. Cirio, C. Pregno, and W. Ricciardi. 2009. "Hospital Discharge Planning and Continuity of Care for Aged People in an Italian Local Health Unit: Does the Care-Home Model Reduce Hospital Readmission and Mortality Rates?" *BMC Health Services Research* 9 (22).
- Davies, C. 1990. "Enjoy Your Stay at our Patient Hotel." *Health Service Journal* 100 (5217): 1316–17.
- De Souza, L. B. 2009. "Trends and Approaches in Lean Healthcare." *Leadership in Health Services* 22 (2): 121–139.
- Donnelly, P., Q. D. Sandifer, D. O'Brien, and E. A. Thomas. 1995. "A Pilot Study of the Use of Clinical Guidelines to Determine Appropriateness of Patient Placement on Intensive and High Dependency Care Unit." *Journal of Public Health Medicine* 17 (3): 305–310.
- Dunnion, M. and E. Dunne. 2004. "Clinical Directorates: Stakeholders' Knowledge and Expectations." *British Journal of Health Care Management* 10 (1): 10–17.
- Friedman, S. M., D. A. Mendelson, S. L. Kates, and R. M. McCann. 2008. "Geriatric Co-Management of Proximal Femur Fractures: Total Quality Management and Protocol-Driven Care Result in Better Outcomes for a Frail Patient Population." *Journal of the American Geriatrics Society* 56 (7): 1349–56.
- Giannakouris, K. 2008. "Ageing Characterises the Demographic Perspectives of the European Societies." In *Statistics in Focus*, Vol. 72. Luxembourg: Eurostat.
- Harvey, I., R. Jenkins, and L. Llewellyn. 1993. "Enhancing Appropriateness of Acute Bed Use: Role of the Patient Hotel." *Journal of Epidemiology and Community Health* 47 (5): 368–372.
- Helay, J. and M. McKee, Eds. 2002. *Hospitals in a Changing Europe*. Buckingham: Open University Press.

- Heldman, J. C. 1962. *Elements of Progressive Patient Care*. Washington, DC: US Public Health Service.
- Hogan, D. F., C. MacKnight, and H. Bergman. 2003. "Models, Definitions, and Criteria of Frailty." *Aging Clinical and Experimental Research* 15 (3 Suppl.): 1–29.
- Huckman, R. S. and G. P. Pisano. 2005. "Turf Battles in Coronary Revascularization." *New England Journal of Medicine* 352 (9): 857–859.
- Iapichino, G., A. Pezzi, E. Borotto, G. Mistraletti, M. Meroni, and D. Corbella. 2005a. "Performance Determinants and Flexible ICU Organisation." *Minerva Anestesiologica* 71 (6): 273–280.
- Iapichino, G., D. Radrizzani, A. Pezzi, E. Assi, P. Di Mauro, G. Mistraletti, and F. Porta. 2005b. "Evaluating Daily Nursing Use and Needs in the Intensive Care Unit: A Method to Assess the Rate and Appropriateness of ICU Resource Use." *Health Policy* 73 (2): 228–234.
- Iapichino, G., A. Pezzi, C. Minelli, D. Radrizzani, B. Barberis, G. Belloni, and P. Bianchi. 2000. "Measuring Complexity/Level of Care and Appropriateness of Resource Use in Intensive Care Units." *Minerva Anestesiologica* 66 (7): 541–547.
- Inouye, S. K., M. J. Schlesinger, and T. J. Ly. 1999. "Delirium: A Symptom of How Hospital Care is Failing Older Persons and a Window to Improve Quality of Hospital Care." *American Journal of Medicine* 106 (5): 565–573.
- International Hospital Federation. 2008. *The International Hospital Federation Reference Book 2008/2009*. London: Pro-Brook.
- International Hospital Federation. 2007. *The International Hospital Federation Reference Book 2007/2008*. London: Pro-Brook.
- Jaklevic, M. C. 2002. "Making Room for More. New Admission and Discharge Center at Ill. Hospital Relieves Chronic Overcrowding in the Emergency Room and Gets Patients Care Quicker." *Modern Healthcare* 32 (38): 30–32, 34, 36.
- Jencks, S. F., M. V. Williams, and E. A. Coleman. 2009. "Rehospitalization Among Patients in the Medicare Fee-for-Service Program." *New England Journal of Medicine* 360 (14): 1418–28.
- Jennett, B. 1984. "Inappropriate use of intensive care." *British Medical Journal* 289 (6460): 1709–1711.
- Landefeld, C. S., R. M. Palmer, D. M. Kresevic, R. H. Fortinsky, and J. Kowal. 1995. "A Randomized Trial of Care in a Hospital Medical Unit Especially Designed to Improve the Functional Outcomes of Acutely Ill Older Patients." *New England Journal of Medicine* 332 (20): 1338–42.
- Leff, B. 2009. "Defining and Disseminating the Hospital-at-Home model." *Canadian Medical Association Journal* 180 (2): 156–157.
- Lega, F. 2008. "The Rise and Fall(acy) of Clinical Directorates in Italy." *Health Policy* 85 (2): 252–262.
- Lega, F. 2004. "Reorganising Healthcare Delivering in hospital: Structure and Processes to Serve Quality." In *Health Care Policy, Performance and Finance: Strategic Issues in Health Care Management*, edited by H. Davies and M. Tavakoli. Aldershot, England: Ashgate.
- Lega, F., and C. DePietro. 2005. "Converging Patterns in Hospital Organisation: Beyond the Professional Bureaucracy." *Health Policy* 74 (3): 261–281.
- Leichsenring, K. 2004. "Developing Integrated Health and Social Care Services for Older Persons in Europe." *International Journal of Integrated Care* 4. Published July 2004. www.ijic.org/index.php/ijic/article/viewArticle/107.
- Levin, D., V. Rao, and J. Bonn. 2005. "Turf Wars in Radiology: The Battle for Peripheral Vascular Interventions." *Journal of the American College of Radiology* 2 (1): 68–71.
- Leykin, Y., N. Costa, and A. Gullo. 2001. "Analisi e Confronto delle Linee Guida Riguardanti la Gestione della Recovery-Room." *Minerva Anestesiologica* 67 (7–8): 563–571.
- Lim, W. K., S. F. Lambert, and L. C. Gray. 2003. "Effectiveness of Case Management and Post-Acute Services in Older People after Hospital Discharge." *Medical Journal of Australia* 178 (6): 262–266.
- Lockward, H. J., L. Gidding, and E. J. Thomas. 1960. "Progressive Patient Care." *Journal of the American Medical Association* 172 (2): 132–137.
- Mazzocato, P., C. Savage, M. Brommels, H. Aronsson, and J. Thor. 2010. "Lean Thinking in Health Care: A Realist Review of the Literature." *Quality and Safety in Health Care* 19 (5): 376–382.

- McKee, M. and J. Helay (Eds.). 2002. *Hospitals in a Changing Europe*. Buckingham: Open University Press.
- Mintzberg, H. 1983. *Structuring in Fives: Designing Effective Organization*. Englewood Cliffs, NJ: Prentice-Hall.
- National Health Service. 1999. *Comprehensive Critical Care: A Review of Adult Critical Care Services*. Department of Health. Published May 25. www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4006585.
- Neogy, I. and I. Kirkpatrick. 2009. *Medicine in Management: Lessons across Europe*. CIHM University of Leeds. Accessed January 2010. www.cihm.leeds.ac.uk.
- Parker, S. G., R. Fadayevatan, and S. D. Lee. 2006. "Acute Hospital Care for Frail Older People." *Age and Ageing* 35 (6): 551–552.
- Parker, S. G., S. M. Peet, A. M. McPherson, A. M. Cannaby, K. Abrams, R. Baker, W. Wilson, J. Lindesay, G. Parker, and D. R. Jones. 2002. "A Systematic Review of Discharge Arrangements for Older People." *Health Technology Assessment* 6 (4): 1–183.
- Pirret, A., M. 2002. "Utilizing TISS to Differentiate Between Intensive Care and High-Dependency Patients and to Identify Nursing Skill Requirements." *Intensive and Critical Care Nursing Journal* 18 (1): 19–26.
- Porter, M. E. and E. O. Teisberg. 2006. *Redefining Health Care: Creating Value-Based Competition on Results*. Boston: Harvard Business Press.
- Ramaiah, S. 1994. "Community Hospitals in the New NHS." *British Medical Journal* 308 (6227): 487–488.
- Rechel, B., Y. Doyle, E. Grundy, and M. McKee. 2009. *How Can Health Systems Respond to Population Aging?* Copenhagen: WHO Regional Office for Europe.
- Rockwood, K. 2005. "What Would Make a Definition of Frailty Successful?" *Age and Ageing* 34 (5): 432–434.
- Rollow, W., T. R. Lied, P. McGann, L. LaVoie, R. T. Kambic, D. W. Bratzler, A. Ma, E. D. Huff, and L. D. Ramunno. 2006. "Assessment of the Medicare Quality Improvement Organization Program." *Annals of Internal Medicine* 145 (5): 342–353.
- Saravanakumar, K., L. Davies, M. Lewis, and G. M. Cooper. 2008. "High Dependency Care in an Obstetric Setting in the UK." *Anaesthesia* 63 (10): 1081–86.
- Shepperd, S., H. Doll, R. M. Angus, M. J. Clarke, S. Iliffe, L. Kalra, N. Aimonio Ricauda, V. Tibaldi, and A. D. Wilson. 2009. "Avoiding Hospital Admission Through Provision of Hospital Care at Home: A Systematic Review and Meta-Analysis of Individual Patient Data." *Canadian Medical Association Journal* 180 (2): 175–182.
- Sincock, J. L. and M. G. Szwarcbord. 2008. "Redesigning Care at the Flinders Medical Centre: Clinical Process Redesign Using 'Lean Thinking.'" *Medical Journal of Australia* 188 (6 Suppl.): s27–31.
- Takakuwa, K. M., F. S. Shofer, and S. B. Abbhul. 2007. "Strategies for Dealing with Emergency Department Overcrowding: A One-Year Study on how Bedside Registration Affects Patient Throughput Times." *Journal of Emergency Medicine* 32 (4): 337–343.
- Tomassini, C. R., M. Nerattini, A. Porri, V. Peruzzi, C. Busoni, C. Lenzi, and M. S. Verzuri. 2008. "A New Solution to Avoid Overcrowding in Emergency Departments." Paper presented at the HEPS, Strasbourg, France, June 25–27.
- Townsend, J., M. Piper, A. O. Franck, S. Dyer, W. R. S. North, and T. W. Meade. 1988. "Reduction in Hospital Readmission Stay of Elderly Patients by a Community Based Hospital Discharge Scheme: A Randomized Controlled Trial." *British Medical Journal* 297 (6647): 544–547.
- Tulloch, A., C. How, M. Brent, R. Chapman, B. Burns, and S. M. Pomey. 2007. "Admission and Discharge practices: High Dependency Unit Audit Outcome." *Contemporary Nurse* 24 (1): 15–24.
- UK Audit Commission. 1992. *Lying in Wait: The Use of Medical Beds in Acute Hospitals*. London: HMSO.
- UK Department of Health and Social Security. 1974. *Community Hospitals: Their Role and Development in the National Health Service*. London: HMSO.
- United Nations. 2001. *World Population Ageing: 1950–2050*. New York: Department of Economic and Social Affairs.
- Villa, S., M. Barbieri, and F. Lega. 2009. "Restructuring Patient Flow Logistics Around Patient Care Needs: Implications and Practicalities from Three Critical Cases." *Health Care Management Science* 12 (2): 155–165.

- Vissers, J. 1998. "Patient Flow-Based Allocation of Inpatient Resources: A Case Study." *European Journal of Operational Research* 105: 356–370.
- Vissers, J. and R. Beech. 2005. *Health Operations Management: Patient Flow Logistics in Health Care*. London: Routledge.
- Wan, T. T., B. Y. J. Lin, and A. Ma. 2002. "Integration Mechanisms and Hospital Efficiency in Integrated Health Care Delivery Systems." *Journal of Medical Systems* 26 (2): 127–143.
- Wild, C. and M. Narath. 2005. "Evaluating and Planning ICUs: Methods and Approaches to Differentiate Between Need and Demand." *Health Policy* 71 (3): 289–301.
- Wilkinson, E. 2007. "What Will the UK's Hospital Services Look Like in the Future?" *Lancet* 369 (9569): 1249–50.
- Zajac, J. D. 2003. "The Public Hospital of the Future." *Medical Journal of Australia* 179 (5): 250–252.
- Zuck, D. 1995. "Anaesthetic and Postoperative Recovery Rooms." *Anaesthesia* 50 (5): 435–438.

PRACTITIONER APPLICATION

Thomas A. Hackney, FACHE, president/CEO, Foundation for Better Health, Birmingham, Alabama

Change is inevitable, whether it be institutional, professional, or individual. As change occurs in the way healthcare is provided, some people will recognize it and take advantage of the opportunity. Others may be threatened, withdraw to reduce risks, and thereby miss the chance to develop a superior delivery system and product. In relation to Lega and Calciolari's research, the need for increasing efficiencies and better outcomes while controlling or reducing costs are drivers of change. In the United States health delivery change is fomented further by the aging of the baby boomers—a significant demographic shift that brings more complexities to healthcare than challenges from smaller past generations—and by natural and man-made disasters of recent years. Cost pressures, care quality issues, and many other factors are producing needed change. Changes are coming at us from many directions.

The authors' many proposed options for future healthcare delivery may be consolidated into four broad categories: hospitals, rehabilitation, long-term care, and terminal care. In American healthcare, these categories are sometimes interrelated and other times distinguished by their own defined levels of care. The healthcare continuum takes different forms in various communities. Across the continuum, people voice concerns about high costs, fragmented care, and lack of complete information.

As we contemplate the authors' suggestions, it is imperative to consider the culture of the society as well as the cultures of the providers. To ignore the differences between cultures and between private, public, and nationalized healthcare systems could lead to system failure at many levels and result in patients not receiving the care they desire.

As the rate and breadth of technological development increases, all parties involved in healthcare delivery must remind themselves that the relationship between patients/families and their physicians is core to our ability to serve and reach desirable outcomes for all parties. Attempts that fragment delivery and coordination of service and duties may prove to be harmful and counterproductive to the

desired outcomes of the most important party, the patient. We must remind ourselves and those around us constantly that healthcare is very personal for individual patients, their families, and their other supporters.

I agree with the authors that there needs to be better collaboration among specialists, and what's more, I believe there should be better collaboration among all providers, period.

During a review and investigative mission to Costa Rica and Mexico recently, I noted a dramatic increase in medical tourism promotions to the American and European markets. I noticed similar efforts in a recent trade mission to Cuba. This medical tourism modality has been developing since World War II in India, Thailand, and Turkey, originating from Europe. Fostering collaboration in this arena is going to be challenging, but this is a billion-dollar market that is growing internationally.

Earlier this year, we spent time reviewing some private and public hospitals in Yucatan and Costa Rica. Some were integrated with public programs; others were standalone corporate hospitals owned by entities in Texas and Spain. Notable in all elements of care was the presence of families. We must remain aware that a supportive social structure is important to patients' successful recovery when they leave the system. However, in evaluating the cultural matters in these hospitals, a great deal of study and expense will be required to implement improvements as the authors suggest.

The authors present research that suggests that home visits by primary care clinicians can lead to reduced readmissions, reduced mortality rates, greater patient satisfaction, lower rates of complications, and lower costs. This outcome makes sense if one ignores the costs of personnel. Over recent years, boutique medical practices have developed and succeeded, but only at a premium that lower- and middle-class citizens cannot afford. In less developed countries, this practice is more likely, but it is lower-tech and lower-cost.

Organizations in the United States have tried integrating acute care with long-term care in recent years. Staff and physicians have a difficult time adjusting to the different levels of care in the same building. My organization finally succeeded in developing an off-site long-term care facility and outpatient clinic on site, but the clinic was located in a different building. Trying to force the issue and combine facilities caused more errors than cost savings would justify. Therefore, I caution against integrating some levels of care until there is clear evidence that the community, staff, and physicians are able to support and benefit from this idea of coevolution. Yet the authors are correct that technology and epidemiology are not the only factors pressing for modifications in the system. As we move forward to take advantage of our future healthcare opportunities, everyone involved must consider the current economic and political impact on costs and sustainability.

Wisdom must be exercised when trying to integrate different providers with differing missions. Given economic chaos, we must make solid, wise choices now with costs and delivery systems, as it may take 10 to 15 years for the United States and the rest of the world to readjust systems and cultures regarding health needs to maintain stability.