Journal of HOSPITAL MEDICINE www.journalofhospitalmedicine.com

Acute Medicine in the United Kingdom: First-Hand Perspectives on a Parallel Evolution of Inpatient Medical Care

G. Randy Smith, Jr., MD, FHM[1*], Jason M. Stein, MD, SFHM[2], Mike C. Jones, MD (Hons), FRCP (Edin)[1]

[1]Department of Acute Medicine, Royal Infirmary of Edinburgh, NHS Lothian, Edinburgh, United Kingdom; [2]Section of Hospital Medicine, Emory University School of Medicine, Atlanta, Georgia.

Hospital medicine has emerged in the United States (US) to address the complexity of hospital care and over the last 15 years has become the fastest growing specialty in US history.[1] The field has been shaped by societal, financial, and clinical factors within American health care, several of which also exist elsewhere in the world.[2,3] Outside the US, analogs of hospital medicine have evolved; in the United Kingdom (UK), where the term and concept of a hospitalist is widely unknown, the specialty of acute medicine has evolved to meet the complex needs of the acutely unwell medical patient in the modern health care environment. The similarities are notable, as are the differences. Our objective in this brief communication is to introduce the UK model of acute medicine to counterparts in the US. We trace the development of acute medicine in the UK, describe current practice, and note features of the model potentially applicable to hospital medicine in the US. We use UK terminology but provide equivalent terms from the US, as shown in Table 1.

Background and Factors Contributing to the Rise of Acute Medicine in the UK

Patient care in the UK National Health Service (NHS) is separated into inpatient and outpatient care. Generally, outpatient care is provided by general practitioners (GPs). GP clinics are independent structures and interact with local NHS-funded services via contract, in contrast to NHS hospitals that are directly controlled by their local NHS municipal-based body. GPs have no independent admission rights to hospitals, and (with few exceptions) do not participate in direct inpatient care. Consequently, patients in GP clinics requiring hospital admission have been referred to hospital-based providers who assume all responsibility for inpatient care. The inpatient medical physician body in the UK is comprised of consultants, each usually trained in both general internal medicine and a medical specialty very similar to US internal medicine–based subspecialists, such as endocrinology or infectious disease. Prior to the advent of acute medicine, each consultant shared responsibility for admission of medical patients with consultants from other specialties, according to a call schedule. Generalist-focused care would be initiated by postgraduate trainee physicians at the time of admission, and continued by the accepting consultant who often conducted subspecialty inpatient and outpatient work simultaneously. Due to advances in medical care at the turn of the century, inpatient care became more specialized; as a result, a general trend developed where the contribution of some specialties to generalist-focused care grew (respiratory and medicine of the elderly), while other specialties began to focus on specialty-specific interventions at the expense of practice and training in the generalist approach to care (cardiology, nephrology). Consequently, interservice disparity in provision of generalist-focused care grew, especially in larger UK teaching hospitals. These trends have manifested as recent changes in UK medical training; presently, all UK medical specialty training programs require concomitant training in general internal medicine competencies, but for some specialties, general internal medicine training is truncated (either by the training program or by allowed choice of trainees) to provide less training than what is required for recognition as a specialist in general internal medicine.

In the UK, the majority of direct clinical care is provided via supervision of postgraduate trainee physicians. Over the last 20 years, limits on resident duty-hours have been applied, much as has happened over the previous decade in the US.[4] In 1991, the NHS and the British Medical Association negotiated a compensation package for physicians in training, termed the New Deal for Junior Doctors, which called for limitation of actual work hours for postgraduate trainee physicians to 56 hours per week. Enforcement of New Deal work guidelines was implemented over the next 12 years; with the introduction of the European Working Time Directive in 2000, work hours were further limited to 48 hours a week by 2009 for consultant and trainee physicians alike. Many UK consultants had already been devoting a higher percentage of time

***Address for correspondence and reprint requests:** G. Randy Smith, Jr., MD, FHM, Clinical Director of Acute Medicine, Combined Assessment Area, Royal Infirmary of Edinburgh, 51 Little France Crescent, Edinburgh EH16 4SA, United Kingdom; Tel.: (44)-131-242-1435; E-mail: randy.smith@luht.scot.nhs.uk

Additional Supporting Information may be found in the online version of this article.

Received: June 27, 2011; **Revised:** September 30, 2011; **Accepted:** November 3, 2011
2012 Society of Hospital Medicine **DOI 10.1002/jhm.1006**
Published online in Wiley Online Library (Wileyonlinelibrary.com).

TABLE 1. Comparison of UK and US Terminology

UK Term	US Term
General practitioner	Family practice physician
Consultant physician*	Attending physician (including all general internists)
Postgraduate trainee physicians	Interns, residents, or fellows
Respiratory service	Pulmonary service
Medicine of the elderly service	Geriatric service
Accident and emergency department	Emergency department
High-dependency unit†	Step-down unit†

*In the UK, "consultant physician" denotes a nontrainee physician who either may serve as the most senior physician primarily responsible for an inpatient or may provide care in an advisory capacity for an inpatient who is the primary responsibility of another consultant physician. This is in contrast to the term "consultant physician" in US terminology, which usually only refers to a nontrainee physician engaged in the latter practice. UK-based general internist equivalents generally do not serve as general practitioners.
† Significant variability in the definition of these terms exists in both countries; in general, high-dependency units are areas with high nursing levels and capability of providing any invasive bedside therapy except invasive ventilation, and in some UK institutions may more closely resemble US telemetry, postsurgical, or coronary care units. Medical staffing models for high-dependency units vary by institution.

to subspecialty-based hospital work and, with the reduced availability of the postgraduate trainee physician resource, the quality of generalist-focused care (for conditions out with a consultant's given specialty) became more disparate between medical specialties, with some specialties providing little generalist input during the admission process. Simultaneously, and in the context of evolving demographic and regulatory pressures (Table 2), the admission procedure required an increasingly specific set of competencies. A subset of consultants from many different specialties began to focus specifically on management of the admission process and to informally self-identify as specialists in acute medicine.

Concerns were published about the quality of initial care for the acutely unwell patient in the UK.[5] The UK Royal Colleges were concerned that patients with acute medical illnesses should receive high-quality clinical care and commissioned a number of working groups to determine how acute medicine should best be delivered. Although initial reports suggested that acute care should be delivered by physicians who maintained an organ-specific specialty focus, subsequent reports suggested that acute medicine should be delivered by specifically trained individuals capable of managing both the acutely ill medical patient and the administration of an acute medical unit (AMU).[6,7] In response to these trends, in 2003 the Royal Colleges of Physicians Joint Committee for Higher Medical Training, now known as the Joint Royal College of Physicians Training Board (JRCPTB), introduced a training curriculum for acute medicine as a subspecialty of general medicine.[8] In 2007, the Royal College of Physicians convened an Acute Medicine Task Force that published further recommendations on the purpose and design of acute medicine services.[9] Application by the JRCPTB to the regulatory bodies for medical education and training in the UK led to recognition in 2009 of acute internal medicine as a separate and distinct specialty from all other specialties, including general medicine.[10]

TABLE 2. Factors Favoring the Emergence of Acute Medicine in the UK

Advances in medical care leading to increased specialization
Increasing numbers of elderly patients with complex medical needs
UK-wide targets to limit emergency department patient stays to <4 hours
New limits to postgraduate trainee physician work hours
Increased standards of supervision of trainee physicians by consultants
Deficiencies in availability of outpatient out-of-hours care
Locally led reconfigurations of health care resources to favor community-based care over inpatient-based care

Adapted from: College of Physicians, London. Acute medical care: the right person, in the right setting—first time. Report of the Acute Medicine Task Force. October 2007.

Acute Medicine in Practice: the Admission Process and Prevention of Prolonged Hospital Admission

The defining characteristic of an acute medical service in the UK is the sole dedication of a team of physician, nursing, and allied health care support staff (such as therapists, pharmacists, and social workers) to the task of admission and initial care of medical inpatients during their work shifts. Admission activity usually takes place in a dedicated physical area: the AMU. The AMU is commonly located near an accident and emergency (AE) department and is often colocated with radiology services, an intensive care unit, and/or a high-dependency unit. Patients may be admitted to the AMU from the AE department, or directly from GP clinics. Generally, an AMU is responsible for a spectrum of medical conditions identical to the conditions potentially managed by a US-based hospitalist. Unlike general and subspecialty medical wards, where consultant bedside input may be available as infrequently as 2 to 3 times per week, twice-daily consultant bedside input into AMU patient care is the recommended standard. AMUs provide consultant bedside input via multiple rounds during the day, or alternatively in a continuous, per-admission rolling pattern. Existing data suggest that AMUs with daily consultant input shorten hospital length of stay and increase same-day discharges without affecting readmissions or mortality.[11] Outside the US, observational studies associate AMUs with improved hospital mortality, shortened length of stay, decreased emergency department waiting times, and improved patient satisfaction.[12]

Three major models of acute medicine practice have evolved in the UK, as outlined in Table 3. The model adopted by each AMU varies depending on availability of staff, AMU bed capacity, the number and variability of patients requiring admission, and even hospital philosophy regarding division of responsibility between acute medicine physicians and those of other specialties. AMUs also vary in critical care capability, with many providing noninvasive ventilation or invasive hemodynamic monitoring. Admitted medical inpatients may bypass an AMU altogether if the AMU staff are unable to provide a procedure (eg, hemodialysis), if a patient requires no further diagnostic clarification or

TABLE 3. Major Models of UK Acute Medicine Practice

Acute Medicine Models	Acute Medicine Team Focus
Triage	Inpatient care rapidly transitioned to specialty medical ward with minimal stay in AMU
Short stay	Short-term inpatient care (<72 hours) provided in AMU, including extensive assessment (eg, physical therapy, sequential radiologic imaging), multispecialty bedside input, medical therapy, and either coordination of postdischarge follow-up or transition of care to specialty medical ward
Hybrid	Subset of patients rapidly transitioned to specialty medical ward, while others receive care in AMU for up to 72 hours; mix dependent on patient needs and available hospital/AMU resources

Abbreviation: AMU, acute medical unit.

stabilization (eg, routine chemotherapy), or if an AMU admission would delay provision of time-sensitive care (eg, percutaneous coronary intervention for ST-elevation myocardial infarction). In all AMUs, patients requiring inpatient care outside of the AMU will be admitted to a medical specialty ward (cardiology, general internal medicine, neurology, etc). Generalist-focused care is then provided by postgraduate trainee physicians on the medical specialty ward, based on guidance generated by AMU physicians, per guidance form their supervising specialty consultant physician (if possible), or through the advice given by other specialty services. Whether AMU physicians continue to be responsible for the care of AMU patients transferred to a general internal medicine ward depends on arrangements based on the particular AMU model and hospital staffing factors.

Weaknesses and Strengths of Acute Medicine Model Applicable to US-Based Hospital Medicine

The acute medicine model of care does instantiate potential risks. Utilization of an acute medicine team hardwires fragmentation of care, necessitating handovers. In the context of US hospital medicine practice, this fragmentation may compromise safety or throughput; however, no such deficit has been detected to date in the context of acute medicine practice in the UK.[13] Mismatch between AMU bed or staff capacity and the number or rate of hospital admissions can generate safety risks or give away efficiency gains. Further inefficiencies can develop if hospital-wide processes of handover, medical decision making, patient transport, and discharge are not synchronized with AMU outflow and intake. Evidence of AMU throughput failure is most often manifest by the premature transfer of patients from AMU to the main hospital ward areas, or by delay of admissions from the emergency department into the AMU (UK standards until recently mandated that $\geq$98% of AE patients complete their AE stay in $\leq$4 hours). Although some successful UK AMUs have minimized these failures, such problems are still experienced by many acute medicine services throughout the UK. Ongoing debate, both local and national, persists within the acute medicine community about how best to address these challenges.

TABLE 4. Areas in Which Acute Medicine Services Can Improve Quality and Efficiency

Initiation of time-sensitive acute care bundles (eg, stroke, sepsis, myocardial infarction)
Initiation of disease-specific protocols (eg, venous thromboembolism prophylaxis, glycemic control)
Outpatient-inpatient information reconciliation (medicines, code status, etc)
Outpatient-to-inpatient consultation (general practitioner phone consultation, telemedicine)
Stewardship of empiric antimicrobial therapy
Early involvement of discharge planning apparatus
Provision of follow-up ambulatory care (medical assessment unit discharge with next-day hospital follow-up)
Outpatient intravenous antibiotic services
Frequent patient admission policies

The strengths of the acute medicine model appear to be clinically meaningful, however. The admission process is complex and occurs at a time when patients are sickest and potentially the most vulnerable. Effective management of this period offers significant opportunity to improve value for patients, hospitals, and health systems. When applied in the context of US hospitalist programs, instances of successful short stay units and active bed management do exist.[14–17] These documented successes represent partial application of UK-style acute medicine activity in a US hospital setting. A multidisciplinary health care team dedicated to streamlining admissions, short stays, and follow-up care offers many potential benefits. Standardization and accountability of admission process, especially important for quality improvement and research activity applicable to the initial portion of a hospital stay, may be more readily realized if embedded into the practice of a discrete cohort of hospital staff. In the UK, several hospital processes fall within the exclusive remit of an acute medicine service (Table 4). Optimization of several of these processes of care can reduce hospital morbidity, mortality, and length of stay.[18–21] As health care financing reform arrives in the US, the ability of American hospitals to manage admission-specific processes of care with reliability will become more vital.[3] In the US, programs that force hospitalists to make ad hoc, moment-to-moment prioritizations about when and where to perform admissions, discharges, and daily ward care may do so at the expense of system predictability, standardization, and patient-centeredness. Where hospitalists are forced to juggle these geographically and substantively disparate care duties, data suggest significant opportunities to reduce variability and improve efficiency.[22,23]

Integrated into US hospital medicine practices, the UK acute medicine model might capture otherwise elusive quality and efficiency gains.[14] By the same token, integrating portions of the US hospital medicine model into a UK acute medicine model could be beneficial as well. For instance, when compared with the

interservice handover common in UK AMUs, intraservice handover (acute care hospitalist-to-ward hospitalist) may promote standardization of the handover process and potentially fewer instances of failed communication. What seems certain is that greater attention should be focused on an exchange of ideas between acute medicine and hospital medicine.

Acknowledgements

The authors thank Valery Akopov for review of the manuscript.

Conflicts of Interest: Drs. Smith and Jones are employed as acute medicine physicians by NHS Lothian, and both have received reimbursement for public speaking related to acute medicine. Dr. Jones has received reimbursement for curriculum design activity for the acute medicine specialty in the UK.

References

1. Society of Hospital Medicine. Growth of Hospital Medicine Nationwide. Available at: http://www.hospitalmedicine.org/Content/NavigationMenu/Media/GrowthofHospitalMedicineNationwide/Growth_of_Hospital_M.htm. Accessed May 15, 2011.
2. Wachter, RM. The hospitalist field turns 15: new opportunities and challenges. *J Hosp Med*. 2011;6:E1–E4.
3. Conway PH. Value-driven healthcare: implications for hospitals and hospitalists. *J Hosp Med*. 2009;4:507–511.
4. Philibert I, Friedmann P, Williams WT. ACGME Work Group on Resident Duty Hours. Accreditation Council for Graduate Medical Education. New requirements for resident duty hours. *JAMA*. 2002; 288:1112–1114.
5. McQuillan P, Pilkington S, Allan A, et al. Confidential inquiry into quality of care before admission to intensive care. *BMJ*. 1998;316: 1853–1858.
6. Federation of Medical Royal Colleges. Acute Medicine: The Physician's Role: Proposals for the Future. A Working Party Report of the Federation of Medical Royal Colleges. London, UK: Federation of Medical Royal Colleges; 2000.
7. Federation of Medical Royal Colleges. Acute Medicine: Making it Work for Patients. A Blueprint for Organization and Training. Report of a Working Party. London, UK: Federation of Medical Royal Colleges; 2004.
8. Joint Royal College of Physicians Training Board. Higher medical training curriculum for subspecialty training in acute medicine for general (internal) medicine NTN holders. July 2003.
9. College of Physicians, London. Acute medical care: the right person, in the right setting—first time. Report of the Acute Medicine Task Force. October 2007.
10. Joint Royal College of Physicians Training Board. Specialty training curriculum for acute internal medicine. August 2009.
11. McNeill GBS, Brahmbhatt DH, Prevost AT, Trepte NJB. What is the effect of a consultant presence in an acute medical unit? *Clin Med*. 2009;9:214–218.
12. Scott I, Vaughan L, Bell D. Effectiveness of acute medical units in hospitals: a systematic review. *Int J Qual Health Care*. 2009;21:397–407.
13. Epstein K, Juraez E, Epstein A, Loya K, Singer A. The impact of fragmentation of hospitalist care on length of stay. *J Hosp Med*. 2010;5: 335–338.
14. Leykum LK, Huerta V, Mortensen E. Implementation of a hospitalist-run observation unit and impact on length of stay (LOS): a brief report. *J Hosp Med*. 2010;5:E2–E5.
15. Howell E, Bessman E, Kravet S, Kolodner K, Marshall R, Wright S. Active bed management by hospitalists and emergency department throughput. *Ann Intern Med*. 2008;149:804–811.
16. Howell E, Bessman E, Marshall R, Wright S. Hospitalist bed management effecting throughput from the emergency department to the intensive care unit. *J Crit Care*. 2001;25:184–189.
17. Kelton DR, Kurani S. MSSU: a multidisciplinary approach to finding cost effective and efficient care for observation patients. Quality and Safety Fall Forum, University HealthSystem Consortium Conference; 2009.
18. Wein L, Wein S, Haas SJ, Shaw J, Krum H. Pharmacological venous thromboembolism prophylaxis in hospitalized medical patients: a meta-analysis of randomized controlled trials. *Arch Intern Med*. 2007;167:1476–1486.
19. Gleason KM, McDaniel MR, Feinglass J, et al. Results of the Medications at Transitions and Clinical Handoffs (MATCH) study: an analysis of medication reconciliation errors and risk factors at hospital admission. *J Gen Intern Med*. 2010;25:441–447.
20. Sandercock PA, Counsell C, Gubitz GJ, Tseng MC. Antiplatelet therapy for acute ischaemic stroke. *Cochrane Database Syst Rev*. 2008; 16:CD000029.
21. Rivers E, Nguyen B, Havstad S, et al. Early goal-directed therapy in the treatment of severe sepsis and septic shock. *N Engl J Med*. 2001; 345:1368–1377.
22. Tipping MD, Forth VE, O'Leary KJ, et al. Where did the day go?—A time motion study of hospitalists. *J Hosp Med*. 2010;5:323–328.
23. Kim CS, Lovejoy W, Paulsen M, Chang R, Flanders SA. Hospitalist time usage and cyclicality: opportunities to improve efficiency. *J Hosp Med*. 2010;5:329–334.