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**Grey's Anatomy Meets Star Trek:
How the Tele-ICU Has Forever Changed Critical Care**

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A medical revolution in critical care is upon us. Since 2000, more than 200 hospitals and over forty healthcare systems in the United States have instituted active Telemedicine Intensive Care Unit (Tele-ICU) programs.¹ These Tele-ICU programs serve over 300,000 ICU patients annually in over twenty-eight states, yet this figure amounts to only four percent of the total number of ICU patients.² Both Dr. Michael Ries, Director of Tele-ICU at Advocate Hospital, and Dr. Neil Rosenberg, Director of Tele-ICU at Resurrection Hospital, have seen first-hand how the dramatic changes in the field of critical care since the inception of the first Tele-ICU program in 2000.³

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¹ VISICU, Inc., Data from 185,000 ICU Admissions Show Significant Reductions in Mortality, May 20, 2008, <http://www.prnewswire.com/mnr/visicu/33159/>; NEW ENG. HEALTHCARE INST., MASS. TECH. COLLABORATIVE, HEALTH TECH. CTR., TELE-ICUS: REMOTE MANAGEMENT IN INTENSIVE CARE UNITS 5, http://www.masstech.org/ehealth/cmyk_tele_icu.pdf (last visited Nov. 8, 2008) [hereinafter REMOTE MANAGEMENT].

² VISICU, Inc., *supra* note 1; REMOTE MANAGEMENT, *supra* note 1, at 5.

³ Telephone Interview with Dr. Michael Ries, Director of Tele-ICU, Advocate Hospital, in Chicago, Ill. (Oct. 9, 2008); Telephone Interview with Dr. Neil Rosenberg, Director of Tele-ICU, Resurrection Hospital, in Chicago, Ill. (Oct. 8, 2008); REMOTE MANAGEMENT, *supra* note 1, at 5.

I. THE ICU'S CHANGING LANDSCAPE

Dr. Ries mentioned that even the layout and appearance of a Tele-ICU may shock a new visitor whose exposure to such a device is limited to seeing it on Grey's Anatomy.⁴ Advocate's staff of physicians – called intensivists – critical care nurses, and health care assistants monitor all 212 adult ICU beds across eight Chicago area hospitals.⁵ Each intensivist may make rounds on 120 patients by watching six separate computer monitors during a ten-hour shift.⁶ This visual seems more reminiscent of Captain Kirk's chair on the bridge of the "Starship Enterprise" more so than a traditional ICU. When asked whether he could have foreseen this technological shift in critical health care, Dr. Rosenberg stated "maybe not twenty-five years ago, but . . . ten to fifteen years ago . . . definitely, yes."⁷

Despite the recent growth in Tele-ICU programs, telemedicine is not as novel as one might think. The American Telemedicine Association defines telemedicine as "the use of medical information exchanged from one site to another via electronic communications to improve patients' health status."⁸ Telemedicine technology has been available since at least 1959, but the adoption rate of this technology in an effort to provide health services has been slow.⁹ Not until 1982, over twenty years later, did literature first mention the use of telemedicine for ICU patients.¹⁰ Thus, the question becomes: what delayed this large-scale proliferation of telemedicine and specifically Tele-ICU programs?

⁴ Telephone Interview with Dr. Michael Ries, *supra* note 3.

⁵ Advocate Health Care, The Electronic Intensive Care Unit (eICU), <http://www.advocatehealth.com/system/info/tvspots/eicu.html#q3> (last visited Nov. 8, 2008).

⁶ Telephone Interview with Dr. Michael Ries, *supra* note 3.

⁷ Telephone Interview with Dr. Neil Rosenberg, *supra* note 3.

⁸ American Telemedicine Association, What is Telemedicine & Telehealth? 1, <http://www.americantelemed.org/news/What%20Is%20Telemedicine.pdf> (last visited Nov. 8, 2008).

⁹ Phoebe Lindsey Barton et al., *Specialist Physicians' Knowledge and Beliefs About Telemedicine: A Comparison of Users and Nonusers of the Technology*, 13 *TELEMEDICINE & E-HEALTH* 487, 488 (2007).

¹⁰ Telephone Interview with Dr. Michael Ries, *supra* note 3 (citing to B.L. Grundy et al., *Telemedicine in Critical Care: Problems in Design, Implementation, and Assessment*, 10 *CRITICAL CARE MED.* 471, 471 (1982)).

II. THE SLOW DIFFUSION OF TELEMEDICINE

Institutions and practitioners alike generally acknowledge that the paucity of definitive findings regarding effectiveness is likely one of the most prominent factors accounting for the slow diffusion of telemedicine.¹¹ Dr. Ries averred that there is “no question that [Tele-ICUs] have been beneficial,” while warning that “there are no good scientific studies” affirming the benefits of telemedicine.¹²

With respect to Tele-ICUs, Dr. Ries and Dr. Rosenberg noted that the difficulty in measuring the specific benefits attributed to telemedicine arises in part because of the program’s collaborative nature.¹³ Since the introduction of Tele-ICU programs, protocols on “both sides of the camera” have been improved.¹⁴ Additionally, checklists have been established for physicians and nurses working at the patient’s bedside, while Tele-ICUs provide real-time patient vital signs and alert systems powered by complex algorithms for faster evaluation of the most critical patients.¹⁵ These improvements work in tandem to advance the quality of critical care.¹⁶ Thus, it remains challenging to isolate the exact benefits specific to Tele-ICUs.

Additionally, complications in locating accurate statistics of Tele-ICU benefits lie in the fact that the authors of these reports tend to have vested interests in the results. In 2004, Sentara Healthcare System, in collaboration with VISICU (the company that sells the Tele-ICU software program) reported results of a twenty-seven percent decrease in mortality for medical ICU patients, a seventeen percent decrease in average patient length-of-stay, and a savings of \$2,150 per patient or three million dollars above program costs.¹⁷ However, Dr.

¹¹ Jim Grigsby et al., *The Evaluation of Telemedicine and Health Services Research*, 11 TELEMEDICINE & E-HEALTH 317, 318 (2005).

¹² Telephone Interview with Dr. Michael Ries, *supra* note 3; Telephone Interview with Dr. Neil Rosenberg, *supra* note 3.

¹³ *Id.*

¹⁴ Telephone Interview with Dr. Michael Ries, *supra* note 3.

¹⁵ *Id.*

¹⁶ *Id.*

¹⁷ *Id.*; VISICU, Inc. Factsheet, <http://www.visicu.com/company/factsheet.html> (last visited Nov. 8, 2008).

Ries highlighted how the potential conflict of interest by VISICU cannot be ignored and may color these disarmingly positive results.¹⁸

Most recently, Advocate Healthcare System has compiled a soon-to-be-released study of the first 5,000 patients treated in Advocate's Tele-ICU program.¹⁹ The Advocate statistics demonstrate no improvement in mortality.²⁰ However, Dr. Ries cautioned that, "[W]hat [Tele-ICUs] were doing then is not what they are doing now," meaning that Advocate now has access to updated clinical information systems, has instituted more efficient bedside protocols, and has stronger support from its caregivers.²¹ Dr. Ries noted that this study also included two hospitals that were most resistant to telemedicine integration but have since embraced the Tele-ICU.²² This Advocate study further showcases the difficulty in publishing findings that accurately depict Tele-ICU benefits.²³

In sum, the difficulty of demonstrating the specific advantages attributed to Tele-ICUs has hindered the proliferation of telemedicine into ICUs.²⁴ However, with time, Dr. Ries suggests that the quality of published literature will improve to fuel this medical revolution in critical care.²⁵

III. LEGAL AND REGULATORY BARRIERS

With the advancement of telemedicine, five major legal issues have emerged: 1) licensure, 2) malpractice liability and standard of care, 3) reimbursement, 4) informed consent, and 5) confidentiality and privacy.²⁶

Generally, Illinois requires a physician treating a patient located within the state to be licensed by the state's licensing body.²⁷ Not only do physicians need

¹⁸ Telephone Interview with Dr. Michael Ries, *supra* note 3.

¹⁹ *Id.*

²⁰ *Id.*

²¹ *Id.*

²² *Id.*

²³ *Id.*

²⁴ Telephone Interview with Dr. Michael Ries, *supra* note 3.

²⁵ *Id.*

²⁶ Roman J. Kupchynsky II & Cheryl S. Camin, *Legal Considerations of Telemedicine*, 64 TEX. B.J. 20, 22 (2001).

²⁷ *See, e.g.*, Medical Practice Act of 1987, 225 ILL. COMP. STAT. 60/49.5 (1987).

to comply with state licensure requirements, but physicians also must offer proof of malpractice insurance that includes coverage for Tele-ICUs.²⁸ In Illinois, corporations, such as Advocate Healthcare Corporation, will commonly pay for a physician's medical malpractice insurance.²⁹ Dr. Ries approached the Illinois State Medical Inter-Insurance Exchange (ISMIE) to act as the universal carrier for Tele-ICU coverage.³⁰ This universal carrier, ISMIE, has eliminated the due diligence complications by ensuring that each separate physician's insurance carrier complies with industry standards.³¹

Also, sparse reimbursements have also been cited as barriers to the rapid spread of telemedicine.³² Only nineteen states (including Illinois) currently offer reimbursement for telemedicine services.³³ Further, each state has its own guidelines for dealing with reimbursement matters.³⁴ However, according to Dr. Ries, reimbursements remain non-existent for most Tele-ICU services.³⁵

Currently, Congress has excluded Tele-ICU services from reimbursement under Medicare, but that may change soon. On July 15, 2008, the Medicare Improvement for Patients and Providers Act of 2008 was successfully enacted into law after both the Senate and the House successfully overrode President Bush's veto.³⁶ Introduced by Representative Charles Rangel (D-NY) on June 20, 2008, the Act contained several payment-related provisions, including one to expand the list of eligible originating sites for telemedicine services.³⁷ Section

²⁸ Telephone Interview with Dr. Michael Ries, *supra* note 3.

²⁹ *Id.*

³⁰ *Id.*

³¹ *Id.*

³² Barton et al., *supra* note 9, at 488; U.S. DEP'T. OF HEALTH & HUMAN SERVS., 2001 TELEMEDICINE REPORT TO CONGRESS 1 (2001) available at <ftp://ftp.hrsa.gov/telehealth/report2001.pdf>.

³³ Alan Naditz, *Medicare's and Medicaid's New Reimbursement Policies for Telemedicine*, 14 TELEMEDICINE & E-HEALTH 21, 21 (2008).

³⁴ *Id.*

³⁵ Telephone Interview with Dr. Michael Ries, *supra* note 3.

³⁶ Medicare Improvements for Patients and Providers Act of 2008, Pub. L. No. 110-275, 122 Stat. 2494 (2008); Thomas (Library of Congress), Search Results, <http://thomas.loc.gov/cgi-bin/bdquery/z?d110:HR06331:@@R|TOM:/bss/d110query.html> (last visited Nov. 8, 2008).

³⁷ Medicare Improvements for Patients and Providers Act of 2008, Pub. L. No. 110-275, § 149, 122 Stat. 2494 (2008); Thomas (Library of Congress) *supra* note 36.

149 of the Act outlines three new sites eligible for payment of telemedicine services beginning on or after January 1, 2009: (1) hospital-based or critical access hospital-based renal dialysis centers, (2) skilled nursing facilities, and (3) community mental health centers.³⁸ This expansion of originating sites facilitates the dissemination of telemedicine services across the U.S. and increases Medicare patient access to vital health care services that are not ordinarily available on a local basis.³⁹

A newly proposed bill further expands the list of telemedicine providers to include physical therapists, occupational therapists and speech-language pathologists.⁴⁰ This bill also would enhance the Centers for Medicare and Medicaid Services' process of updating the list of covered telemedicine services by creating an advisory committee to make recommendations on the addition or deletion of such services.⁴¹ Dr. Rosenberg even suggested that a logical step would be to include reimbursements for Tele-ICU services.⁴²

IV. PALPABLE BENEFITS GIVE RISE TO TELE-ICU ADOPTION

Regardless of the dearth of scientific studies compounded by the various legal and regulatory barriers, the practical benefits of Tele-ICUs are palpable. Dr. Rosenberg described how Tele-ICUs have standardized patient care while augmenting the level of crisis intervention.⁴³ At Resurrection, telemedicine technology allows for physicians to simultaneously monitor 170 ICU beds in eight different hospitals for nineteen hours a day.⁴⁴ Without Tele-ICUs, Resurrection could not afford to staff these hospitals with trained physicians and

³⁸ Medicare Improvements for Patients and Providers Act § 149.

³⁹ Center for Telehealth and E-Health Law, New Medicare Legislation Increases List of Eligible Originating Telehealth Sites, <http://www.telehealthlawcenter.org/?c=175&a=1911> (last visited Nov. 11, 2008).

⁴⁰ S. 2812, 110th Cong. § 3 (2008).

⁴¹ *Id.*

⁴² Telephone Interview with Dr. Neil Rosenberg, *supra* note 3.

⁴³ *Id.*

⁴⁴ *Id.*

nurses.⁴⁵ Also, common sense suggests that the ability of a fully rested physician responding to urgent needs of sick patients will produce a higher level of care than a physician who has been working a twenty-hour shift in the ICU.⁴⁶ Finally, Tele-ICUs have opened up job opportunities for individuals, such that physically handicapped individuals with the requisite knowledge may have a successful medical career they otherwise may not have had.⁴⁷ In effect, pioneering Tele-ICU programs, such as those at Resurrection and Advocate, have not only dramatically improved patients' access to critical care services but also serve as a model for the integration of telemedicine into modern medical practice across the country.

⁴⁵ *Id.*

⁴⁶ *Id.*

⁴⁷ *Id.*