Table F-5. Emergency medical services/emergency department evidence table: patient characteristics

| **Author, Year**(See Appendix C for full citation) | **Number Analyzeda** | **Population** | **Referring Providers Specialty/Type** | **Consulting Provider Specialty/Type** | **Patient Present?** | **Patient Setting** | **Modalities of Telehealth Consultation Intervention** | **Timing** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Amorim, 2013 | 2,588A: 919B: 1,669 | Rural patients | ED physician | Neurologists | Yes | ED/EMS | Videoconference  | Real-time |
| Astarcioglu, 2015 | 108A: 55B: 53 | Adults, average age 62.2 in Group A and 64.6 in Group B, majority male, with expected comorbidities for STEMI patients | ED | Interventional cardiology | No | ED/EMS | WhatsApp | Real-time |
| Audebert, 2006 | 3,122A: 1,151B: 1,971 | Adults | Multiple (non-neurology) | Neurology | Yes | ED/EMS | Videoconference, radiological data transfer  | Real-time |
| Bergrath, 2012 | 64A: 46B: 18 | NR | EMS physician | Hospital-based EMS physician | Yes | ED/EMS | Videoconference | Real-time |
| Bladin, 2015 | 282A: 144B: 138  | Adult | ED physicians (with medical registrars and nursing staff) | Neurologists/stroke specialist | Unclear - patient was present in the ED, but did not seem like the consulting specialist saw the patient directly | ED/EMS | Telephone and radiology images; video camera unclear | Real-time |
| Brennan, 1998 and 1999 | 100A: 50B: 50 | NR | Nurse | Emergency physician | Yes | ED/EMS | Videoconference | Real-time |
| Brokmann, 2016b | 160A: 80B: 80Complete Numerical Rating ScaleA: 32/80B: 65/80 | Pediatric and adults | Paramedic | EMS physician | Yes | ED/EMS | Video | Real-time |
| Brokmann, 2016 | 78A: 39B: 39 | Adults | Paramedic | EMS physician | Yes | ED/EMS | Video | Real-time |
| Brunetti, 2014 | 297A: 174B: 123 | Adults | EMS | Cardiologist | Yes | ED/EMS | Smart phone and electronic EKG | Real-time |
| Chan, 2012 | 594A: 427B: 167 | Adults | Paramedic | ED physician | Yes | ED/EMS | ECG transmitted electronically | Real-time |
| Cho, 2011 | 25A: 13B: 12 | Adults | Emergency residents | Emergency physician | Yes | ED/EMS | Videoconference | Real-time |
| Choi, 2006 | 655A: 327B: 328 | Stroke | Academic medical center | Neurology | Yes | ED/EMS | Videoconference  | Real-time |
| Chowdhury, 2012 | 97 A: 52 B: 45  | Adults | ED doctors and senior stroke nurse | Stroke specialist | Yes | ED/EMS | Videoconference plus S&F scans | Real-time |
| Darkins, 1996 | 16,700A: 6,729B: 9,972, 51 seen using TH | Emergency  | Academic medical center | Emergency- orthopedic  | Yes | ED/EMS | Videoconference  | Real-time |
| Dayal, 2016 | 1,106A: 524B: 582 | Pediatric | ED physician | Pediatric critical care physician | Yes | ED/EMS | Videoconference | Real-time |
| Demaerschalk, 2010 | 54A: 27B: 27 | Adults | ED physician | Stroke neurologist | Yes | ED/EMS | Videoconference | Real-time |
| Dharmar, 2013  | 320A: 199B: 58C: 63 | Pediatric emergencies | Academic medical center | Pediatric critical care | Yes | ED/EMS | Videoconference or telephone | Real-time |
| Dharmar, 2013 | 234A1: 85A2: 76B: 73 | Children | ED physician | Pediatric Critical Care | Yes | ED/EMS | Videoconference | Real-time |
| Dharmasaroja, 2010 | 576A: 170B: 406 | Adults | Neurology residents | Neurology | Yes | ED/EMS | Telephone, transfer of radiological data | Real-time |
| Duchesne, 2008 | 814A: 351B: 463 (51 sent to trauma center) | Rural patients | Nurse practitioner | Physician | Yes | ED/EMS | Videoconference  | Real-time |
| Fong, 2015 | 152A: 102B: 50 | Not specified  | Internist | Neurologist | Yes | ED/EMS | Telephone, teleradiology | Real-time  |
| Goh, 1997 | 63A: 28B: 35 | Not specified  | Not specified | Neurologist | Unclear | ED/EMS | Telephone, teleradiology | Real-time  |
| Handschu, 2008 | 151A: 74B: 77 | Not specified  | Not specified | Neurologist | Yes | ED/EMS | Videoconference, data transfer | Real-time  |
| Hashimoto, 2001 | 29A: 17B: 12 | Not specified | Not specified | Radiation-oncology | Yes | ED/EMS | Digital images of any scans | Unclear |
| Heffner, 2015 | 479A: 272B: 134C: 73 | Not specified  | Neurologist  | Neurologist | Yes | ED/EMS | Not specified | Real-time  |
| Hubert, 2016 | 2,691A: 912B: 1,779 | Adult | ED physician | Neurologist | Yes | ED/EMS | Videoconference | Real-time |
| Ickenstein, 2005 | 319A: 155B: 164 | Adults | ED physician | Neurologist | Yes | ED/EMS | Videoconference | Real-time |
| Ionita, 2009 | 155A: 128B: 27 | Not specified  | Not specified | Neurology | Yes | ED/EMS | Not specified | Real-time |
| Itrat, 2016 | 156A: 56B: 100 | Adult | EMS | Vascular neurologist | Yes | ED/EMS | Videoconference | Real-time |
| Johansson, 2011 | 351A: 304B: 47 | Adults | ED physician | Stroke neurologist | Yes | ED/EMS | Videoconference | Real-time |
| Kim, 2011 | 938A: 750B: 188 | Suburban and urban emergency patients seen by EMS system | EMT | Public health doctors | Yes | ED/EMS | Code division multiple access for real-time information exchange, patient data monitoring via online method, and cellular phone  | Real-time |
| Langabeer, 2016 and 2017 | 11,140A: 5,570B: 5,570 | Adults | Paramedic | EMS physician | Yes | ED/EMS | Video | Real-time |
| Macedo, 2016 | 376A: 113B: 263 | Adult | ED physician | Cardiologist | Yes | ED/EMS | Videoconference | Real-time |
| Machado, 2018 | 314A: 219B: 95 | Adults | ED clinicians | Intensivist | Yes | ED/EMS | NR | Real-time |
| Marcolino, 2013 | 2,600A: 1,242B: 1,358 | Adults | Hospitalist | Cardiac specialist  | Yes | ED/EMS | Telephone and electronic EKG | Real-time |
| Martinez-Sanchez, 2014 | 484A: 259B: 225 | Adults | ED physician | Neurologist | Yes | ED/EMS | Videoconference | Mixed |
| Martinoni, 2011 | 3,901A: 2,298B: 1,603 | Adults | EMS | Cardiologist | Yes | ED/EMS | ECG transmission | Real-time |
| Mathews, 2008 | 191A: 78B: 113 | Rural emergency | Urban hospital | Multiple | Unclear | ED/EMS | Videoconference  | Real-time |
| Mazighi, 2017 | 47A: 22B: 25 | Adults | ER physician | Stroke neurologist | Yes | ED/EMS | Video | Real-time |
| Meyer, 2008 | 222A: 111B: 111 | Adults at least 18 years old | Emergency nurse practitioners | NR | Unclear | ED/EMS | Videoconference  | Real-time |
| Mohr, 2018 (same patients as Mohr 2017) | 2,662A: 2,371B: 291 | Adults | Rural ER physician | ED physician | Yes | ED/EMS | Video | Real-time |
| Mohr, 2017(same patients as Mohr 2018) | 2,662A: 2,371B: 291 | Adults | Rural ER physician | ER physician and ED nurse | Yes | ED/EMS | Video | Real-time |
| Nagao, 2012 | 54A: 30B: 24 | Adults | Emergency physician | Neurologist | Yes | ED/EMS | Videoconference | Real-time |
| Narasimhan, 2015 | 14,522A: 7,261B: 7,261  | All patients seen in ED for psychiatry issues | ED doctors | Psychiatrists with at least one year experience in emergency psychiatry | Yes | ED/EMS | Videoconference | Real-time |
| Natafgi, 2017 | 173,339A: 164,291B: 9,048 | Not specified | Rural ER physician | Emergency medicine physician | Yes | ED/EMS | Videoconference | Real-time |
| Nguyen-Huynh, 2018 | A: 310B: 557 | Adult | ED physician | Neurologist | Yes | ED/EMS | Videoconference | Real-time |
| Noble, 2005 | 253A: 191B: 62 | Not specified | Nurse | ED | Yes | ED/EMS | Unclear; pictures or video | Unclear |
| Ortolani, 2006 | 658A: 316B: 176C: 166 | Adults | EMS physician | Cardiologist | Yes | ED/EMS | ECG transmission | Real-time |
| Ortolani, 2007 | 121A: 79B: 42 | Patients with STEMI with cardiogenic shock | Ambulance personnel (1 physician, 2 paramedics) | Cardiologists | No | ED/EMS | Records (EKG trace sent) | Asynchronous |
| Paik, 2017 | 84A: 42B: 42 | NR | ED clinicians | Plastic surgeon and orthopedics | Yes | ED/EMS | IPad app | Real-time |
| Patel, 2015 | 50A: 25B: 25 | Pediatric | Pediatric transport team | Medical command officer | Yes | ED/EMS | Videoconference | Real-time |
| Pedersen, 2009 | 1,437A: 821B: 616 | Adults | EMS | Cardiologist | Yes | ED/EMS | ECG transmissionmobile phone with fax | Real-time |
| Pedragosa, 2009 | 399A: 201B: 198 | Rural patients | ED physician | Neurologist | Yes | ED/EMS | Videoconference | Real-time |
| Pervez, 2010 | 296A: 181B: 115 | Adults | Emergency physician | Neurologist | Yes | ED/EMS | Video | Real-time |
| Poon, 2001 | 327 A: NRB: NR | Neurosurgical patients | Physician | Neurosurgeon | Yes for videoconference, unclear for others | ED/EMS | Videoconference | Mixed |
| Saffle, 2009 | 98A: 28B: 70 | General | Physician | Physician | Yes | ED/EMS | Videoconference  | Real-time |
| Sairanen, 2011 | 1,091A: 985B: 106, 61 received thrombolysis | Adults | Emergency physician | Neurologist | Yes | ED/EMS | Videoconference and review of images, if provided | Real-time |
| Sanchez-Ross, 2011 | 142A: 50B: 92 | Patients confirmed to have STEMI | ED physician | Cardiology | Yes | ED/EMS | Telephone, test results | Mixed  |
| Schwab, 2007 | 302A: 132B: 170 | Adult | ED physician | Neurologist | Yes | ED/EMS | Videoconference | Real-time |
| Sejersten, 2008 | 257A: 89B: 168 | Adults | EMT | Cardiologist | Yes | ED/EMS | ECG to mobile phone | Real-time |
| Southard, 2014 | 62A: 24B: 38 | Rural patients | ED physician | Mental health specialists:social workers, licensed mental health counselors, and counseling psychologists | Unclear | ED/EMS | Videoconference  | Real-time |
| Switzer, 2009 | 75A: 26B: 49 | Adult | ED physician | Neurologist | Yes | ED/EMS | Videoconference | Real-time |
| Taqui, 2017 | 153A: 53B: 100 | Adults | EMT mobile stroke unit | Vascular neurologist | Yes | ED/EMS | Videoconference | Real-time |
| Theiss, 2013 | 1,324A: 168B: 845C: 311 | Adults | Emergency physician | Neurologist | Yes | ED/EMS | Videoconference | Real-time |
| Traub, 2013 | 302A: 196B: 106, 36 used telehealth |   | Nurse | Emergency physician | Yes | ED/EMS | Videoconference | Real-time |
| Tsai, 2007 | 822A: 685B: 137 | General | Physician | Physician | Unclear | ED/EMS | Videoconference, medical record review | Real-time |
| Wong, 2006 | 710A: 235B: 239C: 236 | Consecutive patients from the district general hospital requiring emergency neurosurgical consultation (mean age 58, 60% male) | Not specified | Neurosurgeon | Yes | ED/EMS | Telephone + teleradiology or videoconference | Real-time |
| Yang, 2015 | 138A: 64B: 74 | Pediatric | ED physician | Pediatric critical care physician | Yes | ED/EMS | Videoconference | Real-time |
| Zaidi, 2011 | 142A: 59B: 83 | Adult | NR | Neurologist | Yes | ED/EMS | Videoconference | Real-time |
| Zanini, 2008 | 399A: 263B: 136 | Adults | Ambulance staff  | Cardiologist | Yes | ED/EMS | ECG transmissionPhone | Real-time |
| Zennaro, 2014 | 42A: 42B: 42 (same patients as A) | Pediatric patients presenting with fractures | Pediatrician | Orthopedic surgeon | No | ED/EMS | Telephone +/-sending images via iPad | Asynchronous |

ECG = electrocardiogram; ED = emergency department; EKG = electrocardiogram; EMS = emergency medical services; EMT = emergency medical technician; NR = not reported; S&F = store and forward; STEMI = ST-elevation myocardial infarction; TH = telehealth

a For definitions of interventions and comparisons (e.g., A vs. B), see Table F-4

**See Appendix C. Included Studies for full citations**