

Geographic Access to High Mechanical Thrombectomy Volume Centers, in Florida, 2019

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BACKGROUND

Acute ischemic stroke (AIS) is a leading cause of morbidity & mortality. Mechanical thrombectomy (MT), a complex and time-sensitive procedure, is associated with great outcomes. Regulatory bodies, such as the Joint Commission, have recommended minimum procedural volume threshold of 15 MT annually.

METHODS

- Used ICD-10 codes from FL state inpatient database to capture hospital MT volume, patients with AIS, and patient home zip code as a proxy for location at time of AIS.
- Created service area maps from hospitals performing MT and overlapped patients.
- Determined proportion of patients within various service area distances.

RESULTS

- Out of 297 non-federal hospitals in FL, 105 hospitals (36%) performed any MT, about half performed 1-14 (51) and half performed ≥15 MT (54).
- A total of 3,733 MTs were performed statewide; only 158 MTs (4.2%) of these were performed at the 51 low-volume hospitals that had performed 1-14 MTs.
- Among the 38,657 patients hospitalized for AIS, 86.9% lived within 20 miles or 1 hour of a hospital that performed at least one MT. Restricting the hospitals those those performing ≥15 MT, that percentage dropped by 9.5% to capture 77.4% of patients.
- Among the 2,740 patients who were hospitalized for AIS and underwent MT, 89.5% lived within a 20-miles from a hospital that performed at least 1 MT and 2,276 (83.1%) who lived within a 20-miles from a hospital that performed at least 15 MT annually.

DISCUSSION

Most patients lived within a 1 hour driving distance and all lived within 3 hours of a MT center, irrespective of minimal procedural volume threshold applied. The proposed threshold did not profoundly affect geographic access. However, FL does have more designated stroke centers than states with different stroke systems of care.

Joint Commission minimum procedural volume thresholds would not have a major impact on geographic access to MT in Florida.

Figure 1. Proportion of Patients with AIS or Receiving MT that Live within Different Driving Distances of Any MT Capable Center and High-MT Volume Centers

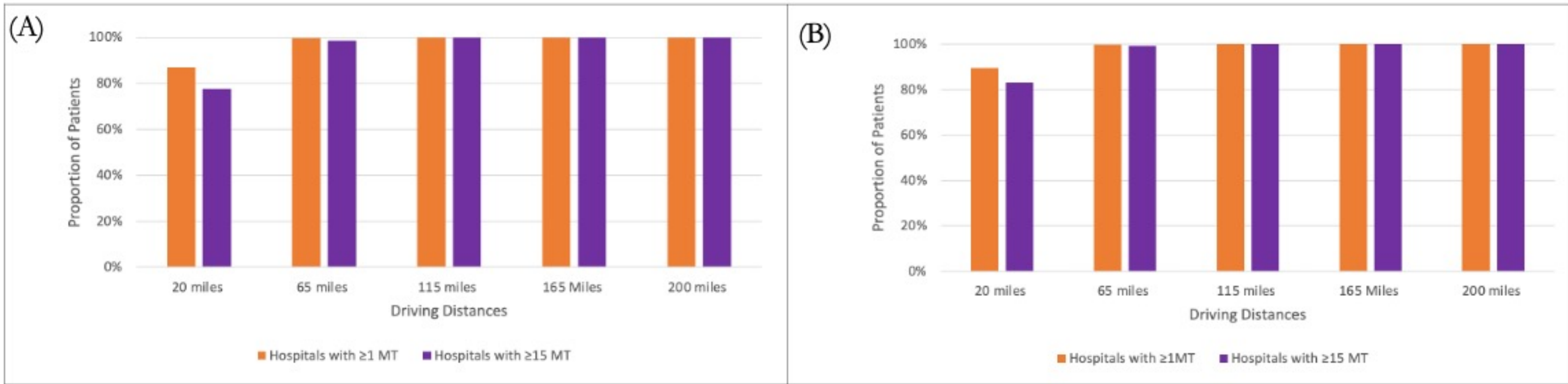
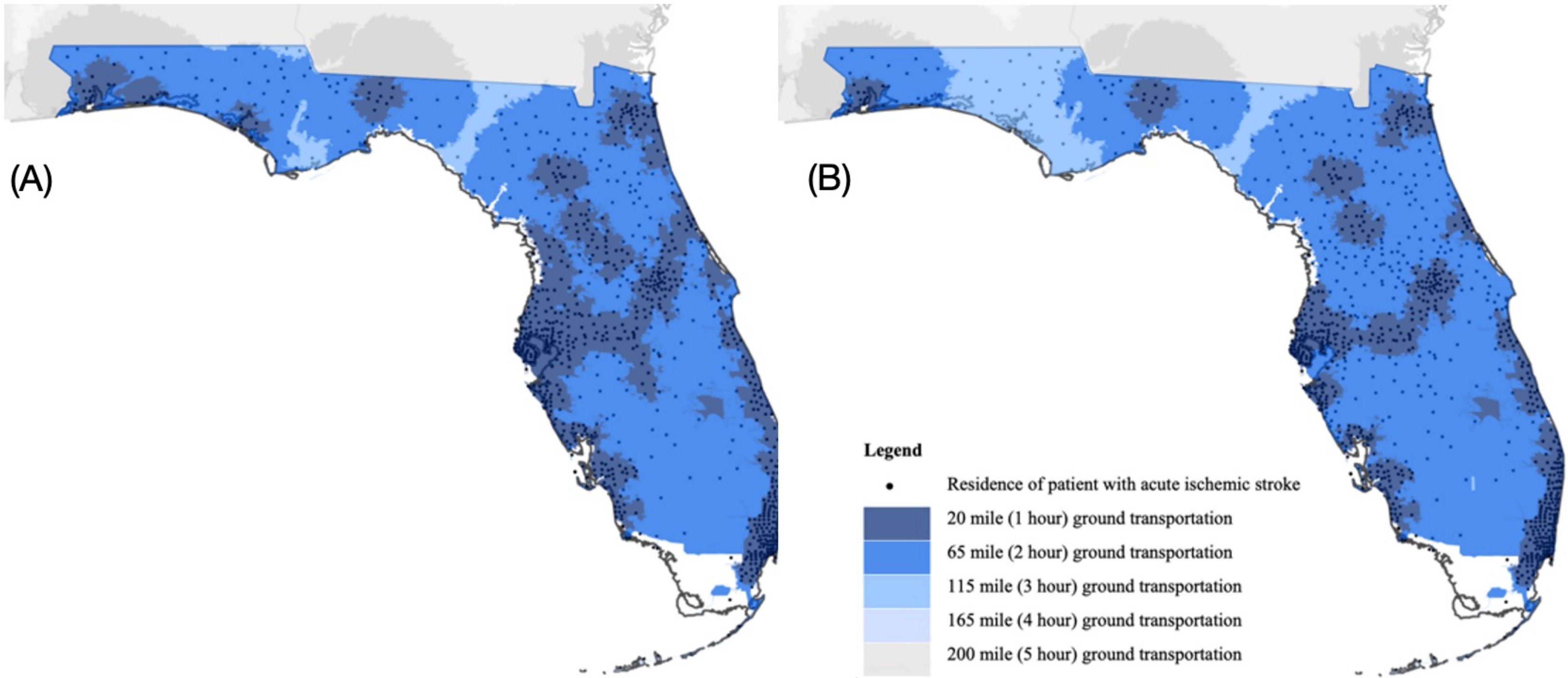


Figure 1 Legend. Proportion of patients (A) with acute ischemic stroke (AIS) and (B) receiving mechanical thrombectomy that live within different driving distances of any MT capable center and high-MT volume centers.

Figure 2. Ground Transport Service Area Map of hospitals that performed at least one or at least 15 MTs in Florida, 2019



(A) any hospital that performed at least one MT

(B) hospitals that performed at least 15 MT



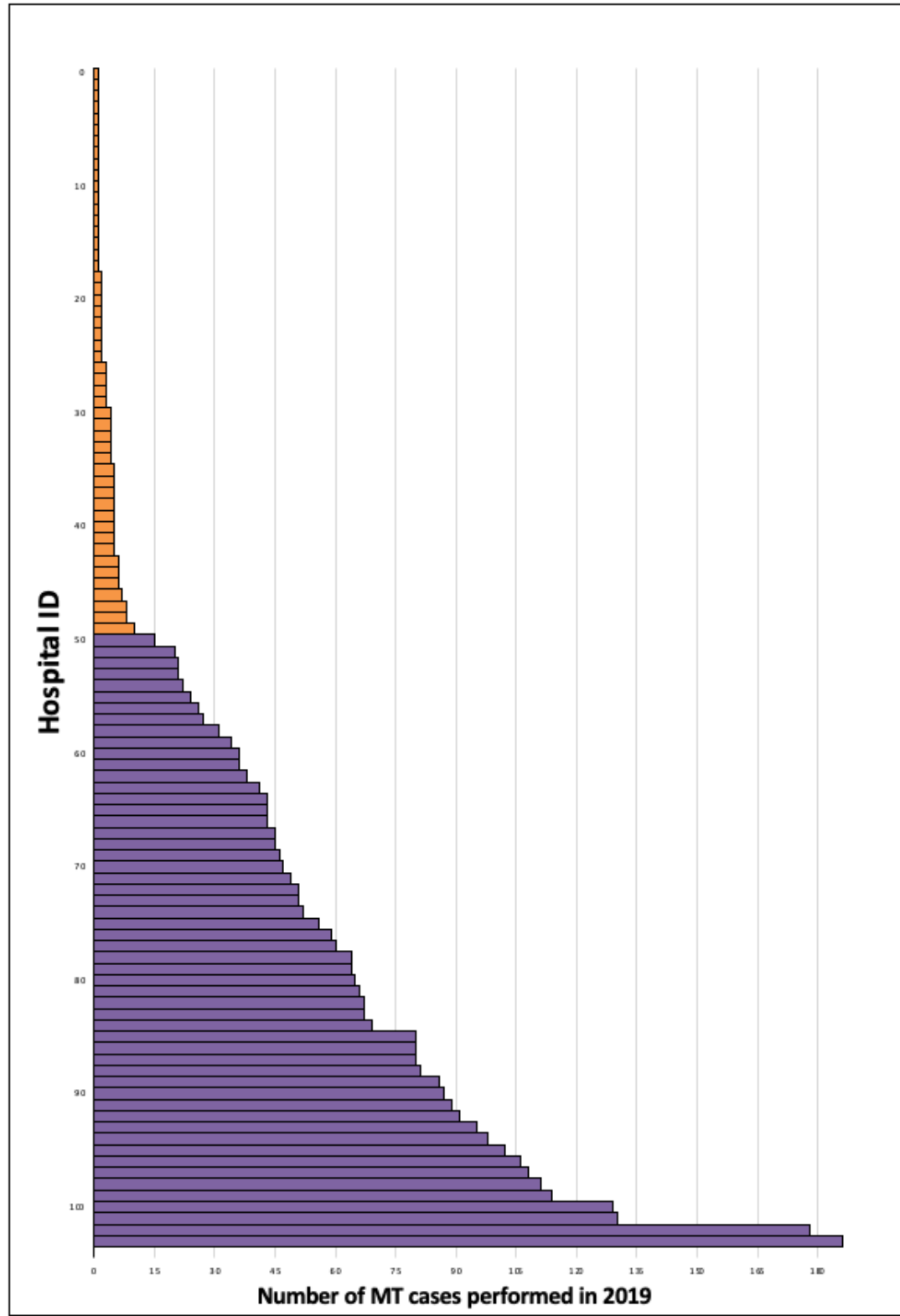
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ADDITIONAL TABLES & FIGURES

Figure 3. Mechanical Thrombectomy Volume per Center in Florida, 2019.



	All Hospitals	No MTs	1-14 MTs (low-volume)	15 or more MTs (high-volume)
Number of Facilities, n (%)	297 (100%)	192 (65%)	51 (17%)	54 (18%)
Total Licensed Beds, median (IQR)	250 (106, 521)	125 (65, 309)	310 (207, 473)	536 (400, 772)
Annual Volume Per Hospital, median (IQR)				
Total Inpatient Discharges	6097 (1631, 14799)	2766 (655, 6185)	13407 (8791, 18151)	21922 (17262, 31021)
Ischemic Stroke Discharges	68 (0, 194)	3 (0, 68)	167 (120, 239)	417 (350, 592)
Percentage of Discharges with Medicare as Expected Primary Payer	53% (41%, 65%)	54% (38%, 69%)	53% (44%, 64%)	47% (39%, 56%)
Percentage of Discharges with Patient Experiencing Homelessness	0.10% (0%, 0.6%)	0.01% (0%, 0.4%)	0.20% (0.1%, 0.6%)	0.40% (0.1%, 1%)
Hospital Characteristics				
Hospital Location ^{1,2}				
Metro	267 (94%)	162 (90%)	51 (100%)	54 (100%)
Micro	10 (4%)	10 (6%)	0 (0%)	0 (0%)
Rural	8 (3%)	8 (4%)	0 (0%)	0 (0%)
Trauma Center ³	42 (22%)	15 (13%)	6 (17%)	21 (49%)
Teaching hospital ⁴	195 (68%)	99 (55%)	44 (86%)	52 (96%)
Critical Access ^{5,6}	10 (4%)	10 (6%)	0 (0%)	0 (0%)
Available Services, n (%)				
Cerebral Angiograms	129 (43%)	34 (18%)	41 (80%)	54 (100%)
Craniotomies/ Craniectomies	106 (36%)	20 (10%)	32 (63%)	54 (100%)
ICU services ⁷	161 (83%)	83 (73%)	35 (97%)	43 (100%)
MRI on site ⁸	156 (81%)	78 (68%)	36 (100%)	42 (98%)
CT on site ⁹	174 (90%)	95 (83%)	36 (100%)	43 (100%)
Telestroke care ⁹	90 (47%)	45 (39%)	21 (58%)	24 (56%)

Legend
* Data missing for 12 hospitals (4%). These hospitals did not perform any MTs.
† Data missing for 104 hospitals (35%) of which 96 hospitals performed 1 or more MT and 11 performed 15 or more MTs.
‡ As defined by the US Census Bureau. A metropolitan statistical area has ≥1 urbanized area of ≥50,000 people; a micropolitan statistical area has ≥1 urban cluster of ≥10,000 but <50,000 people; and remaining areas are otherwise deemed a rural statistical area.
§ Identified as a teaching hospital with any of the following: (1) Member of Council of Teaching Hospital of Association of American Medical Colleges (AAMC), (2) presence of medical or dental residents, (3) recognition by an Accreditation Council for Graduate Medical Education (ACGME) program, or (4) medical school affiliation reported to American Medical Association (AMA).
|| Critical Access Hospital designation based on Centers of Medicare and Medicaid (June 2020) data.
Intensive Care Unit (ICU) services (medical, surgical, or cardiac ICU).
** One hospital that performed ≥15 MTs reported no MRI available.