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OBSTETRICS

US and territory telemedicine policies: identifying gaps in perinatal care



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BACKGROUND: Perinatal regionalization is a system of maternal and neonatal risk-appropriate health care delivery in which resources are ideally allocated for mothers and newborns during pregnancy, labor and delivery, and postpartum, in order to deliver appropriate care. Typically, perinatal risk-appropriate care is provided in-person, but with the advancement of technologies, the opportunity to provide care remotely has emerged. Telemedicine provides distance-based care to patients by consultation, diagnosis, and treatment in rural or remote US jurisdictions (states and territories).

OBJECTIVE: We sought to summarize the telemedicine policies of states and territories and assess if maternal and neonatal risk-appropriate care is specified.

STUDY DESIGN: We conducted a 2014 systematic World Wide Web-based review of publicly available rules, statutes, regulations, laws, planning documents, and program descriptions among US jurisdictions (N = 59) on telemedicine care. Policies including language on the topics of consultation, diagnosis, or treatment, and those specific to maternal and neonatal risk-appropriate care were categorized for analysis.

RESULTS: Overall, 36 jurisdictions (32 states; 3 territories; and District of Columbia) (61%) had telemedicine policies with language referencing consultation, diagnosis, or treatment; 29 (49%) referenced consultation, 30 (51%) referenced diagnosis, and 35 (59%) referenced treatment. In all, 26 jurisdictions (22 states; 3 territories; and District of Columbia) (44%), referenced all topics. Only 3 jurisdictions (3 states; 0 territories) (5%), had policy language specifically addressing perinatal care.

CONCLUSION: The majority of states have published telemedicine policies, but few specify policy language for perinatal risk-appropriate care. By ensuring that language specific to the perinatal population is included in telemedicine policies, access to maternal and neonatal care can be increased in rural, remote, and resource-challenged jurisdictions.

Key words: maternal, neonate, perinatal regionalization, policy, risk-appropriate care, telemedicine

Introduction

Perinatal regionalization, also referred to as “maternal and neonatal risk-appropriate care,” is a risk-based health care delivery system in which resources are ideally allocated during pregnancy, labor/delivery, and postpartum to deliver quality care to mothers and newborns in the most economical and appropriate way.¹⁻³ Typically, maternal and neonatal risk-appropriate care is provided in-person in an office, hospital, or clinic. However, with the advancement of technologies, the opportunity to provide health care remotely, or by telemedicine, has emerged. Telemedicine is a heterogeneous concept, defined by organizations that include the American Telemedicine Association, World Health Organization, and Institute of

Medicine.⁴ Specifically, telemedicine is the delivery of health care services from one geographical location to another—where distance or resources are obstacles to the delivery of care—by health care professionals using electronic communication and exchange to improve a patient’s clinical health status by diagnosing, treating, and preventing diseases and injuries.⁴⁻⁶

Telemedicine is not a separate specialty, but an enhancement to existing services. Studies have demonstrated successful use of telemedicine services such as consultations, diagnoses, and/or treatments to provide adequate perinatal care.⁷⁻¹⁵ For example, Robie and colleagues⁹ in 1998 demonstrated the efficacious use of telemedicine in providing accurate diagnoses and guidance for surgical consultation in the intensive care nursery. Similarly, women with potentially poor pregnancy outcomes were given diagnoses and guidance via a telemedicine consultation with a perinatologist.¹⁰ Nores et al¹² in 1997 demonstrated successful interpretation of first-trimester obstetric ultrasound, directed by a perinatologist in a satellite

location, and the American Academy of Pediatrics (AAP) recent update of the guidelines for transport of neonatal and pediatric patients includes a chapter on telemedicine for emergency or hard-to-reach locations.⁷ For rural or remote settings, telemedicine offers access to specialists and subspecialists, which is an essential need for high-risk maternity and neonatal patients.

The objective of this study is to summarize telemedicine policies of US states and territories and assess how they address maternal and neonatal risk-appropriate care.

Materials and Methods

Study design

A systematic World Wide Web-based review of publicly available information addressing telemedicine care, and telemedicine services specific to perinatal care, was conducted for each US state, territory, and freely associated state (ie, American Samoa, Commonwealth of the Northern Mariana Islands, Federated States of Micronesia, Guam, Marshall Islands, Puerto Rico, Republic of Palau, US Virgin Islands, and District

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of Columbia) from January through June 2014. All policies and legislation published, to date of the study period, by state agencies, state governments, or territories were examined for inclusion in the study. Federal-level policies for the territories that were not directly mentioned in the publicly available information were excluded (eg, any US military aid provisions). Tribal policies developed for use on federally recognized American Indian/Alaska Native reservations were also excluded, as the focus of this analysis was on state- and territorial-level policies. Last, city jurisdictions were excluded from analysis, as city policies were potentially linked to state policies (eg, New York, NY; Los Angeles, CA). We did not include telemedicine policies specific to pediatric care since it has not traditionally been included in the concept of perinatal risk-appropriate care.² A standardized search approach was implemented based on multiple search terms (Table 1). Available policies, rules, codes, administrative laws, licensure regulations, health planning documents, and statewide nongovernmental perinatal health entity publications on telemedicine policies in

perinatal/neonatal health were identified for data extraction using search engines such as Google and Bing; we also searched state World Wide Web sites. Results of the initial search were used to further expand the search strategy.

Data collection process

The United States was divided into the 10 Health Resources and Services Administration regions and territories to facilitate a structured search process. Two abstractors independently and simultaneously searched state-level policies within a region. Each state-level policy, within a region, was also cross-referenced and abstractors completed double-entry of all data. Study authors (D.A.G. and A.M.S.) further validated all abstracted information by reviewing and comparing it with source information. Discrepancies were reconciled during in-person meetings among researchers (E.M.O., C.D.K., and D.A.G.) and data abstractors to ensure consistency in search strategy and abstraction.

Data summary process

The primary abstractor (D.A.G.) reviewed and created an initial summary

of all abstracted data. The secondary abstractor (A.M.S.) validated abstracted data by reviewing summaries, verifying all summary information in the data, and using his legal training and background to examine, interpret, and categorize statutory language. If the statutory language referred to “direct interaction between patient and/or patient’s primary provider” the telemedicine policy was categorized as consultation. If the language included “interpretation of imaging” and/or “screening,” the telemedicine policy was categorized as diagnosis. Finally, if the language referred to “direct care” or “invasive interventions by a physician” it was categorized as treatment (see Table 1 for detailed search terms). The policy language was also summarized by its specificity for maternal and/or neonatal risk-appropriate care.

Statistical methods

Descriptive statistics were used to analyze the abstracted information. Counts and percentages of US states and territories identified with telemedicine policies, as categorized above, and with telemedicine policies specific to maternal and neonatal risk-appropriate care were described. This study was determined not to need institutional review board approval at the Centers for Disease Control and Prevention because it did not include human subjects.

Results

Telemedicine policies

Of the 59 jurisdictions studied (the 50 states; District of Columbia; and 8 territories), 36 (61%) had policy language referencing at least 1 topic of telemedicine care. The 36 jurisdictions were composed of 32 states, 3 territories (Guam, Puerto Rico, and US Virgin Islands), and the District of Columbia (Table 2). In all, 29 (49%) referenced consultation in their policies, 30 (51%) referenced diagnosis, and 35 (59%) referenced treatment.

In all, 26 jurisdictions (44%), of which 22 were states, referenced all 3 topics of telemedicine care. Guam, Puerto Rico, US Virgin Islands, and the District of Columbia also referenced all 3 topics of

TABLE 1

Summary of search terms used and grouping algorithm

Individual search terms (“state” was included in subsequent searches and variations of search phrases were subsequently searched)

[state] telemedicine policy perinatal

[state] telemedicine policy neonatal

[state] perinatal transport coordination

[state] telemedicine policy obstetric

[state] telemedicine legislation

[state] telemedicine policy

[state] telemedicine

[state] telemedicine program

[state] telemedicine neonatal

[state] telemedicine perinatal

[state] telemedicine NICU

Categorizing language for telemedicine care

Consultation = “Direct interaction between patient and/or patient’s primary provider”

Diagnosis = “Provision of interpretation of imaging [screening]”

Treatment = “Direct care or invasive interventions by physician”

Okoroh et al. Perinatal telemedicine policies. *Am J Obstet Gynecol* 2016.

telemedicine care. Six states (10%) referenced only 2 topics of telemedicine care: 4 (Illinois, Nebraska, New Mexico, and West Virginia) included language on diagnosis and treatment, while 2 (Indiana and Montana) included language on consultation and treatment. Four states (7%) included language in only 1 area: Idaho, Maryland, and Michigan referenced treatment, while Pennsylvania referenced consultation (Table 2).

Maternal and neonatal specific telemedicine policy

Of the 59 US jurisdictions, only 3 (5%)—Ohio, North Carolina, and New York—had telemedicine policy language specifically addressing maternal or neonatal risk-appropriate care. While 2 states had policy language specific only to maternal (Ohio) or neonatal (North Carolina) care, New York had language specific to both (Table 3).

Comment

The combination of increasingly affordable and powerful computing and communication technology, along with continuing nationwide concerns about health care access and costs, has propelled telemedicine from an innovative way of practicing medicine to a practical and necessary tool in addressing the health care needs of the nation.¹⁶ Our findings represents the first summary of how state and territory telemedicine policies address maternal and neonatal risk-appropriate care. We found that while the majority of states/territories had policy language for telemedicine care, only 3 states and none of the territories had language specific to maternal and neonatal risk-appropriate care. The paucity of telemedicine policies among the territories, and lack of specificity to perinatal care among those with policies, was unexpected because telemedicine is an effective mechanism for improving medical access in jurisdictions without an advanced care facility, otherwise citizens are required to travel long distances for specialty care.

Despite the fact that the American College of Obstetricians and Gynecologists¹⁷ and AAP^{7,18} have policies advocating the use of telemedicine to expand

TABLE 2

Summary of states and territories with telemedicine policies by categorizing topics of telemedicine care into: consultation, diagnosis, and treatment^a; N = 59 states, territories, and District of Columbia

State/territory	Telemedicine care, consultation ^b	Telemedicine care, diagnosis ^c	Telemedicine care, treatment ^d
Totals, n = 59	29 (49.2%)	30 (50.8%)	35 (59.3%)
Alabama	Yes	Yes	Yes
Alaska	Yes	Yes	Yes
American Samoa	—	—	—
Arizona	Yes	Yes	Yes
Arkansas	—	—	—
California	Yes	Yes	Yes
Colorado	—	—	—
Commonwealth of Northern Mariana Islands	—	—	—
Connecticut	Yes	Yes	Yes
Delaware	Yes	Yes	Yes
District of Columbia	Yes	Yes	Yes
Federated States of Micronesia	—	—	—
Florida	—	—	—
Georgia	Yes	Yes	Yes
Guam	Yes	Yes	Yes
Hawaii	Yes	Yes	Yes
Idaho	—	—	Yes
Illinois	—	Yes	Yes
Indiana	Yes	—	Yes
Iowa	Yes	Yes	Yes
Kansas	—	—	—
Kentucky	Yes	Yes	Yes
Louisiana	—	—	—
Maine	Yes	Yes	Yes
Marshall Islands	—	—	—
Maryland	—	—	Yes
Massachusetts	Yes	Yes	Yes
Michigan	—	—	Yes
Minnesota	—	—	—
Mississippi	Yes	Yes	Yes
Missouri	Yes	Yes	Yes
Montana	Yes	—	Yes
Nebraska	—	Yes	Yes
Nevada	—	—	—
New Hampshire	Yes	Yes	Yes

Okoroh et al. Perinatal telemedicine policies. Am J Obstet Gynecol 2016.

(continued)

TABLE 2

Summary of states and territories with telemedicine policies by categorizing topics of telemedicine care into: consultation, diagnosis, and treatment^a; N = 59 states, territories, and District of Columbia (continued)

State/territory	Telemedicine care, consultation ^b	Telemedicine care, diagnosis ^c	Telemedicine care, treatment ^d
New Jersey	—	—	—
New Mexico	—	Yes	Yes
New York	Yes	Yes	Yes
North Carolina	—	—	—
North Dakota	—	—	—
Ohio	—	—	—
Oklahoma	Yes	Yes	Yes
Oregon	—	—	—
Pennsylvania	Yes	—	—
Puerto Rico	Yes	Yes	Yes
Republic of Palau	—	—	—
Rhode Island	—	—	—
South Carolina	—	—	—
South Dakota	Yes	Yes	Yes
Tennessee	Yes	Yes	Yes
Texas	—	—	—
US Virgin Islands	Yes	Yes	Yes
Utah	Yes	Yes	Yes
Vermont	Yes	Yes	Yes
Virginia	Yes	Yes	Yes
Washington	—	—	—
West Virginia	—	Yes	Yes
Wisconsin	—	—	—
Wyoming	—	—	—

^a Dashes in columns represent telemedicine policy that did not specify language for this topic of telemedicine care;

^b Consultation = "Direct interaction between patient and/or patient's primary provider"; ^c Diagnosis = "Provision of interpretation of imaging or [screening]"; ^d Treatment = "Direct care or invasive interventions by provider."

Okoroh et al. Perinatal telemedicine policies. *Am J Obstet Gynecol* 2016.

access to health care services, these policies do not explicitly address the perinatal population, instead they provide guidance on the shortage of providers, health equity, liability, and logistics of telemedicine.^{7,17,18} With such ambiguity, it is understandable that we found only 3 jurisdictions (New York, Ohio, and North Carolina), with telemedicine policies specific to maternal and/or neonatal risk-appropriate care. Although these states have telemedicine language specific to the perinatal

populations within existing policies, we found limited evidence of statewide telemedicine program development for regionalized perinatal care. For instance, the North Carolina statewide medical board recognizes telemedicine as a useful tool in increasing access to health care; however, it released a position statement cautioning that practitioners utilizing telemedicine be held to the same standard of care as those who conduct in-person care, a position with potential to adversely affect development

and expansion of telemedicine programs.^{19,20} In January 2014, the Ohio Senate passed a bill that required Medicaid, and not the state itself, to develop standards for billing and reimbursement for telemedicine services, affecting the state health department's ability to fully implement statewide telemedicine programs.^{21,22} Even though these challenges increase the complexity of developing statewide telemedicine programs for the perinatal population, some changes are occurring. On January 1, 2016, the state of New York implemented a new statewide law that better defines telemedicine and mandates reimbursement coverage by private insurers and Medicaid for telemedicine services, including obstetric care.^{23,24} Such changes may occur in other jurisdictions to improve clinical and national guidelines, policies, and reimbursement mechanisms, and ultimately, patient outcomes.

In jurisdictions without telemedicine policies specific to perinatal risk-appropriate care, individual hospitals and/or regional centers have implemented telemedicine programs for the benefit of their perinatal populations. For instance, in Florida, Iowa, and Idaho, regional centers extended maternal-fetal medicine services to women in underserved rural areas to include genetic counseling and other neonatal services.²⁵⁻²⁹ Since 2003, the Antenatal and Neonatal Guidelines, Education, and Learning System (AN-GELS) program in Arkansas has empowered local providers through telemedicine support, consultations, and best practices development to utilize the expertise of the state's only board-certified maternal-fetal medicine specialists located in Little Rock.³⁰ AN-GELS' long-term goal is for all pregnant women in Arkansas to be no more than 20 miles from an interactive consultation, via compressed video, with high-risk pregnancy specialists.³¹ Multiple studies have demonstrated the benefit of this innovative program.^{3,32-34} For instance, Glen et al³² in 2006 found that this distance-based obstetrical management system can increase maternal transports to tertiary centers, allowing

TABLE 3

Summary of states and territories with telemedicine policy language specific to maternal and/or neonatal care^{a,b}; N = 59 states, territories, and District of Columbia

State/territory	Maternal-specific policies	Neonatal-specific policies
Total, n = 59	2 (3.4%)	2 (3.4%)
Ohio	Yes	—
North Carolina	—	Yes
New York	Yes	Yes

^a This table does not include language referencing general pediatric services within telemedicine policies;

^b Dashes in columns represent telemedicine policy that did not specify either maternal or neonatal telemedicine policy.

Okoroh et al. *Perinatal telemedicine policies*. *Am J Obstet Gynecol* 2016.

for proper coordination of high-risk pregnancies. Similarly, Kim et al³ in 2013 demonstrated that a telemedicine collaborative program such as ANGELS improves level of care provision and services received, and decreases infant mortality among very low-birthweight neonates.

In other areas of medicine, states are moving forward with statewide telemedicine programs. From 2011 through 2012, 10 hospitals in North Carolina began participating in the Albemarle Hospital/Duke Endowment Telepsychiatry Network. The early results of the project found a 47% reduction in length of stay and a 35% reduction in 30-day readmit rates. During the 2013 session, the North Carolina General Assembly approved and funded a statewide telepsychiatry program for hospital emergency departments, modeled largely after the efficacious Albemarle Hospital Foundation telepsychiatry program. By 2014, this statewide Telepsychiatry Program (NC SteP) had saved the state approximately \$7 million, and a growing number of hospitals were requesting inclusion in the program.^{35,36}

If all states and territories implemented similar statewide telemedicine

programs for perinatal care in remote and resource-challenged areas, access to maternal-fetal medicine specialists would expand. For instance, Sullivan et al³⁷ in 2005 concluded that if an area increased the number of available maternal-fetal specialists to 5 per 10,000 live births, a reduction of approximately 27% in the risk of maternal death can occur. Nevertheless, further research to understand perinatal outcomes associated with the implementation of statewide telemedicine programs are warranted.

Our study was limited by the use of publicly available information; researchers did not directly contact jurisdictions to confirm or obtain additional information regarding telemedicine policies. Additionally, policies and regulations that were not published or publicly available were not incorporated into this review, precluding inclusion in the overall sample. Furthermore, since we did not include federal-level policies for the territories that were not directly mentioned in the publicly available information, we may have underestimated the number of telemedicine policies available in the territories. Finally, changes that may have occurred in jurisdictional policies following the data collection phase of this review were not included. Regardless of these potential limitations, including language on maternal and neonatal risk-appropriate care in existing telemedicine policies would have an impact on overall cost of care provision in states because it would improve access to care and increase risk-appropriate care provision and services received among this population.

In conclusion, the majority of states and territories have the infrastructure for perinatal telemedicine implementation through established policies addressing the topics of consultation, diagnosis, and treatment. By including language specific to perinatal risk-appropriate care in these existing telemedicine policies, states and territories can better manage current challenges to appropriate care coordination and utilization of health care services facing their maternal and neonatal populations and potentially realize cost-avoidance, increase care

coordination, and improve the provision of medical care. ■

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