Access to assisted reproductive technology centers in the United States

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Objective: To describe the disparity of assisted reproductive technology (ART) centers in the United States as they relate to residential locations of populations in their reproductive years and state-mandated coverage for infertility services.

Design: Cross-sectional study.

Setting: Population in reproductive years (women 20–44 years; men 20–49 years) based on US Census 2000 data. Assisted reproductive technology centers registered with the Society for Assisted Reproductive Technology (SART) in 2005.

Main Outcome Measure(s): Populations within service area served by in-state and neighboring state ART centers as defined by a 60-minute travel time along road networks from each center.

Result(s): Service areas for 387 of 390 ART centers were calculated. Fourteen states had some form of mandated coverage. Underserved states included Alaska, Montana, Wyoming, and West Virginia. The northeastern United States had the greatest percentage of overserved population with 66%–100% study population within 60 minutes of an ART center. Female age stratification showed the highest age group (35–44 years) per state in northern New England and the youngest in Utah and District of Columbia. Median total study population within 60 minutes of an ART center in their own state was higher in mandated versus nonmandated states.

Conclusion(s): Disparity of access to care for infertility services exists from the standpoint of population service areas for ART centers and state-mandated coverage. Female age stratification may help anticipate future need for services with existing resource distribution. (Fertil Steril® 2010;93:745–61. ©2010 by American Society for Reproductive Medicine.)

Key Words: ART, SART, population, service areas, mandated coverage

Infertility for a couple in the United States is defined as the inability to achieve a pregnancy within 1 year of unprotected intercourse. Nearly 85% of couples achieve a pregnancy in this time frame, leaving 15% of couples potentially seeking reproductive assistance (1, 2). The 2002 National Survey of Family Growth showed that among 62 million women of reproductive age (15–44 years), 1.2 million (2%) had an infertility-related medical appointment within the previous year. An additional 7.4% of women in the survey were infertile (3).

Assisted reproductive technology (ART), which has been available since 1981, is the leading surgical treatment for couples diagnosed with infertility. Assisted reproductive technology refers to all fertility treatments in which both egg and sperm are handled. The ART includes IVF and related technologies. These procedures involve surgical egg retrieval from the ovaries and laboratory handling of the egg and sperm with transfer of the embryo back into the female partner or donated. As mandated by the 1992 Fertility Clinic Success Rate and Certification Act (FCSRCA), the Center for Disease Control (CDC) has monitored and publicly reported the performance of ART centers, specifically IVF practices, including pregnancies, deliveries, and multiple births. Although for many couples ART offers the only viable opportunity for having children without seeking adoption, finances and transportation proximity have prevented many from accessing these services. Until recently, insurance coverage for ART/infertility services has not been available to couples. In 2005, there were 14 states that mandated partial or complete ART coverage be included in insurance packages (4). The effect of this insurance status has also not been studied in relation to the supply of ART centers and populations likely to consume such services. In addition, the number and location of centers providing ART in relation to the distribution of those most likely needing these resources has not been the focus of research to date. The effect of this insurance status has also not been studied in relation to the supply of ART centers and populations likely to consume such services.

The objectives of our study were twofold: [1] describe the spatial disparity of ART centers based on their location in relation to the male and female populations in their reproductive years, and [2] identify any association between state-

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mandated coverage for infertility services and number and location of ART centers. We hypothesize that higher potential populations in their reproductive years and potential need correlate with higher numbers of ART services. We also hypothesize that rational distribution of infertility care secondary to mandated status should result in the placement of ART centers in proximity to populations in their reproductive years.

MATERIALS AND METHODS

Databases

The 2000 US Census estimates by sex and age groups for population in the reproductive years (women 20–44 years and men 20–49 years) and defined as the study populations, were calculated from block group and county level (aggregated from census block groups). The ART centers registered with the Society for Assisted Reproductive Technology (SART) in 2005 were retrieved from the website www.sart.org. Street network and speed limit data from ESRI/Geographic Data Technologies (now TeleAtlas) was used.

Analytical Tools

Geographic Information System (GIS) software—ArcGIS 9.2 and Network Analyst Extension of ArcGIS 9.1 by Environmental System Research Institute () was used to map centers. Sixty-minute travel distances from centers were calculated using US highways and major roads Environmental System Research Institute /TeleAtlas (http://www.teleatlas.com). The software programs MS Access and Excel were used to compile data tables.

Analysis Methods

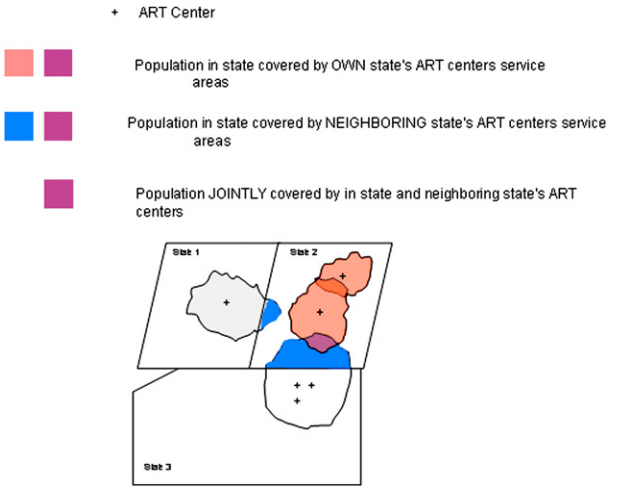
States with partial or complete mandated insurance coverage for ART services in 2005 were identified and stratified versus nonmandated states. The male and female study populations and the total male and female state population (all ages) were calculated from the 2000 Census data and tabulated for each state.

All the ART centers included in the 2005 SART database were located geographically based on their full street addresses. ArcGIS 9.2 and Environmental System Research Institute /TeleAtlas street network data were used to process the addresses and calculate coordinates of the points representing the locations of the ART centers. Some manual process was involved to locate approximately 15% of the addresses. The US Census data were used to calculate and describe study populations per ART center within each state.

Driving distance within 60 minutes from each ART center was calculated exclusive of the three ART centers located in Puerto Rico, due to inadequate road mapping. Driving distance was calculated using data of street networks and speed limits for all the road segments that could be reached within a 60-minute travel time from the exact address of the ART centers. All the road segments reached from one ART center were then generalized into an area, which defined an ART service area. This step used the Network Analyst extension (module) of ArcGIS 9.1.

FIGURE 1

Diagrammatic representation of service areas for assisted reproductive technology (ART) centers (60 minutes driving distance from each ART center) and methodology to define population served by in and out-of-state ART center service areas.



Nangia. Access to ART centers in the United States. Fertil Steril 2010.

Service areas were overlaid on top of census block groups. Census block groups touched by the ART service areas were considered as being served by these ART centers. These populations were aggregated for each state, thereby determining the total populations served by ART centers within a state. The proportion of each state population in the reproductive years covered by ART services within a 60-minute driving distance was calculated. In addition, the proportion of a state's population served by in- and out-of-state ART centers was determined (Fig. 1).

The female study population per state was stratified by age, as permitted by the 2000 Census database: 20; 21; 22–24; 25–29; 30–34; 35–39; and 40–44 years old.

Statistical Methods

Comparisons of means and medians by mandated status were performed using the *t*-test and Wilcoxon rank sum test (Stata 10.0, College Station, TX).

RESULTS

The SART database for 2005 identified 390 ART centers in the United States and its territories. The 60-minute service areas were calculated for 387 centers. Three ART centers located in Puerto Rico were excluded from analyses due to this territory's inadequate road maps. In 2005, 14 states had partial or complete state-mandated insurance coverage for ART