APPENDIX 2: BENCHMARKS USED IN EVALUATING WYOMING'S HEALTHCARE RESOURCES

North Carolina Rural Health Research and Policy Center – Primary Care

The Rural Health Research and Policy Center at the University of North Carolina analyzed primary care physicians relative to population size for non-metropolitan counties in the United States. This analysis showed the number of non-metropolitan counties with particular ranges of population size per one primary care physician.

Table 1: Frequency of Population per Primary Care Physician in Non-Metropolitan Counties [1]

Population per Primary Care Physician	Number of Non-Metropolitan Counties in the U.S. in 2000
205 to 1,499	547
1,500 to 2,999	1,084
3,000 to 3,499	139
3,500 to 4,999	173
5,000 to 22,000	178
No Primary Care Physicians	173

As the information above shows, one physician per 1,500 to 2,999 people was the most common physician-to-population range among non-metropolitan counties. We also examined the primary care physician-to-population ratios that many state Medicaid agencies require of the managed care organizations with which they contract. Consistent with the University of North Carolina's research result, most states' Medicaid agencies require that their managed care organizations maintain primary care physician-to-population ratios of one to 1,500 to 2,999 people.[2]

[1] Randy Randolph, Katherine Gaul and Rebecca Slifkin, *Rural Populations and Health Care Providers: A Map Book*, (September 2002), p.5.

[2] George Washington University Medical Center for Health Services and Research Policy, "Primary Care/Provider Ratios," *Negotiating the New Health System*. Available online: http://www2.gwu.edu/~chsrp/Fourth_Edition/GSA/Subheads/gsa138.html.

We chose to use one primary care physician per 2,500 people as the benchmark for our analysis of Wyoming's supply of primary care physicians. This is the same benchmark used for Nevada's rural health care plan.[3]

Dartmouth Atlas Project – Obstetricians/Gynecologists, Cardiologist, General Surgeons and Orthopedic Surgeons

The Dartmouth Atlas Project, the results of which were published in 1998, is well-regarded research on physician workforce planning by the Center for Evaluative Clinical Sciences at Dartmouth Medical School. This research examined actual experience of health plans and communities to identify those that produced efficient results – that is, they "achieve low levels of deployment of clinically active physicians without a measured loss of patient welfare due to a shortage of physicians".[4] By analyzing large healthcare claims databases, the researchers identified three benchmarks for their apparent efficiency[5]:

- A large health maintenance organization
- The Minneapolis, Minnesota region because of its high managed care penetration (39.4 percent in 1995)
- The Wichita, Kansas region for its predominantly fee-for-service market with low managed care penetration (4.5 percent in 1995)

The Dartmouth researchers then used these benchmarks to compare the supply of physicians across 306 hospital referral regions in the United States.[6]

For the Wyoming Rural Healthcare Study, Navigant Consulting used the Dartmouth Atlas Project's Wichita, Kansas benchmark for the selected physician specialties that we evaluated, because Wyoming, like Kansas, has relatively low managed care penetration. The Dartmouth Atlas Project's Wichita physician- to-population ratios provide benchmarks of efficient supply of providers that has shown to maintain patient welfare.

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[3] State of Nevada, Department of Human Services, "Strategic Plan for Rural Health Care in Nevada," (October 2002). Available online: http://www.hr.state.nv.us/shcp/documents/RuralHealth_Documents/NVReportAppendix/NV-Report-FINAL.pdf.

[4] The Dartmouth Atlas of Health Care 1998, "Appendix on the Physician Workforce in the United States," (1998). Available online: http://www.dartmouthatlas.org/pdffiles/98workforceappdx.pdf.

[5] Efficiency is defined as health plans and communities that achieve low levels of deployment of clinically active physicians without a measured loss of patient welfare due to a shortage of resources.

[6] The Dartmouth Atlas of Health Care 1998, "Appendix on the Physician Workforce in the United States," (1998). Available online: http://www.dartmouthatlas.org/pdffiles/98workforceappdx.pdf.

State of North Carolina Certificate of Need Program – Nursing Facility Beds

We used the State of North Carolina's bed-to-population ratios by age grouping as the benchmark. North Carolina uses these ratios in calculating nursing home bed need for its Certificate of Need (CON) program.[7] These beds per 1,000 population are:

- 0.58 beds for ages 0 to 64
- 10.95 beds for ages 65 to 74
- 38.96 beds for ages 75 to 84
- 120.69 beds for ages 85 and over

[7] North Carolina Department of Health and Human Services, State Health Coordinating Counsel, *Proposed 2005 State Medical Facilities Plan*, p.197.

Appendix 3: Core and Specialty Service Provider Types

Service	Provider Types[i]	Source[ii]

Primary Care Services	• Primary Care Physicians
	  ➢ Internal Medicine
	  ➢ Family Practice
	  ➢ General Practice
	  ➢ Pediatrics
	• Physician Assistants
	• Nurse Practitioners
	• Federally Qualified Health Centers
	• Rural Health Clinics
		• Wyoming Medicare Claims from September 2003 through August 2004
		• Wyoming Medicaid Claims State Fiscal Year (SFY) 2004
		• Wyoming Medical Society's 2004 Active Members
		• Wyoming Medical Center 's Physician Directory (October 2004[iii])
		• Wyoming Licensed and/or Certified Health Care Facilities October 2003: Federally Qualified Health Centers and Rural Health Clinics
		• Local Healthcare Professionals

Obstetrical Care Services	• Physicians • Obstetricians and Gynecologists (OB/GYNs) • Family Practitioners Providing Obstetrics • Certified Nurse Midwives • Hospitals Providing Obstetrical Services	• Wyoming Medicare Claims from September 2003 through August 2004 • Wyoming Medicaid Claims SFY 2004 • Wyoming Medical Society's 2004 Active Members • Wyoming Medical Center 's Physician Directory (October 2004[iv]) • Local Healthcare Professionals (December 2004)
Mental Health/Substance Abuse Services	• Psychiatrists • Clinical Psychologists • Licensed Clinical Social Workers[v] • Community Mental Health Centers • Psychiatric Hospitals • Hospitals Providing Mental Health Services • Other Mental Health Services	• Wyoming Medicare Claims from September 2003 through August 2004 • Wyoming Medicaid Claims SFY 2004 • Wyoming Medical Society's 2004 Active Members • Wyoming Medical Center 's Physician Directory • Wyoming Mental Health Professions Licensing Board's Licensed Clinical Social Workers November 2004 • Local Healthcare Professionals

Appendix 3: Core and Specialty Service Provider Types (Cont'd)

Core Service	Provider Types[vi]	Source
Emergency Transportation Services	• Ambulances • Paramedics • Lifeflight	• Wyoming Medicare Claims from September 2003 through August 2004 • Wyoming Medicaid Claims SFY 2004 • Wyoming Office of Emergency Medical Services August 2004 • Wyoming Ambulance Trip Reporting System (WATRS)[vii]
Dental Services	Dentists (This does not include orthodontists, oral surgeons, periodontists and endodontists).	• Wyoming Medicare Claims from September 2003 through August 2004 • Wyoming Medicaid Claims SFY 2004 • Wyoming Dental Association's Members[viii] • Local Healthcare Professionals
Home Health Services	Home Health Agencies	• Wyoming Medicaid Claims SFY 2004 • Wyoming Licensed and/or Certified Health Care Facilities October 2003: Home Health Agencies • Local Healthcare Professionals
Inpatient Hospital Services	• Acute Care Hospitals • Critical Access Hospitals	• Wyoming Medicare Claims from September 2003 through August 2004 • Wyoming Medicaid Claims SFY 2004 • Wyoming Licensed and/or Certified Healthcare Facilities October 2003: Hospitals and Critical Access Hospitals[ix]
Nursing Facility Care Services	• Nursing Homes • Acute Care Hospitals with Skilled Nursing and Other Long-term Care Beds	• Wyoming Medicaid Claims SFY 2004 • Medicare list of Wyoming Nursing facility care services[x] • Wyoming Licensed and/or Certified Healthcare Facilities October 2003: Nursing Care Facilities [xi]
Pharmacy Services	Licensed Pharmacies	• Wyoming Medicaid Claims SFY 2004 • Wyoming's Board of Pharmacy 2005 Active Pharmacies List[xii]

Appendix 3: Core and Specialty Service Provider Types (Cont'd)

Core Service	Provider Types[xiii]	Source
General Surgery Services	• Hospitals Providing Surgical Services • Ambulatory Surgical Centers • General Surgeons	• Wyoming Medicare Claims from September 2003 through August 2004 • Wyoming Medicaid Claims SFY 2004 • Wyoming Medical Society's 2004 Active Members • Wyoming Medical Center's Physician Directory • Local Healthcare Professionals
Cardiologists	Cardiologists	• Wyoming Medicare Claims from September 2003 through August 2004 • Wyoming Medicaid Claims SFY 2004 • Wyoming Medical Society's 2004 Active Members • Wyoming Medical Center's Physician Directory • Local Healthcare Professionals
Medical and Radiation Oncologists	• Medical Oncologists • Radiation Oncologists	• Wyoming Medicare Claims from September 2003 through August 2004 • Wyoming Medicaid Claims SFY 2004 • Wyoming Medical Society's 2004 Active Members • Wyoming Medical Center's Physician Directory • Local Healthcare Professionals
Orthopedic Surgeons	Orthopedic Surgeons	• Wyoming Medicare Claims from September 2003 through August 2004 • Wyoming Medicaid Claims SFY 2004 • Wyoming Medical Society 2004 Active Members • Wyoming Medical Center's Physician Directory • Local Healthcare Professionals

[i] Provider sources classify provider specialties differently. Also, different sources place the same provider in different towns. We attempted to reconcile these discrepancies using information from local healthcare professionals and community members.

[ii] We excluded providers based on comments we received indicating that particular physicians or dentists were no longer practicing in the State.

[iii] Wyoming Medical Center's Physician Directory sent by e-mail from Chris Lorenzen, October 5, 2004.

[iv] Wyoming Medical Center's Physician Directory sent by e-mail from Chris Lorenzen, October 5, 2004.

[v] Licensed Clinical Social Workers have obtained masters level training.

[vi] Provider sources classify provider specialties differently. Also, different sources place the same provider in different towns. We attempted to reconcile these discrepancies using input from local healthcare professionals and community members.

[vii] Office of Emergency Services' 2003 Wyoming Ambulance Trip Reporting System (WATRS) Database. The Wyoming Office of Emergency Services uses the Wyoming Ambulance Trip Reporting System (WATRS) to collect data on emergency transportation trips, including total miles, trips and prehospital care.

[viii] Wyoming Dental Association, "Directory of Members," (2004). [Received by electronic mail from Diane O'Keefe, October 13, 2004.]

[ix] Wyoming Department of Health, Office of Health Facilities, "Hospitals and Critical Access Hospitals," (October 2003). [Received by mail, October 2004.]

[x] United States Department of Health and Human Services, Centers for Medicare and Medicaid Services, "The Official United States Government Site for People with Medicare: Nursing Home Compare," (September 16, 2004) Available online: http://www.medicare.gov/NHCompare/Include/DataSection/Questions/HomeSelect.asp?State=WY0%7CWyoming&sbtStateForm=Next+Step+%3E&Type=State&pagelist=Home&dest=NAV%7CHome%7CSearch%7CHomeSelect%7CSearchCriteria&version=alternate&browser=Default%7C0%7Cunknown&language=English&search_dest=Nav%7CHome%7CSearch%7CSearchCriteria&StateAbbr=WY&StateName=Wyoming.

[xi] Wyoming Department of Health, Office of Health Facilities, "Nursing Care Facilities," (October 2003).

[xii] Wyoming Board of Pharmacy, "Active Pharmacies," (2005) [Received by electronic mail, October 2004.]

[xiii] Provider sources classify provider specialties differently. Also, different sources place the same provider in different towns. We attempted to reconcile these discrepancies using input from local healthcare professionals and community members.

APPENDIX 4: MAPPING METHODOLOGY DESCRIPTION

We mapped Wyoming's geographic characteristics, population and health care providers using ArcMap 8.1.2 Geographic Information System (GIS) software. An extension of this software, StreetMap USA, allowed us to transform providers' street addresses into longitudinal and latitudinal data that could then be mapped using ArcMap. In some instances, StreetMap was unable to find and transform a provider address. This was most common for providers in highly rural areas. In these cases, the online address search vehicles MapQuest[1] and Switchboard[2] were used to find nearby intersections that the software could recognize. In some rare cases, we could not map providers because the StreetMap program also did not recognize neighboring locations. We were unable to map providers in these areas for less than one percent of the providers in Wyoming. We identify those providers we were unable to map in the Appendix 1.

We used the online Geography Network[3] to collect geographic data for the State. We downloaded the following data to produce maps of Wyoming:

- City and town location and population[4]
- Interstates and roads[5]
- Topography[6]

We used data provided in the ArcMap software package to produce state borders. We also downloaded geographic and population data from the United States Census Bureau website for this analysis.[7],[8] We examined the following geographic and population data for this analysis:

- County
- Incorporated Places

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[1] http://www.mapquest.com
[2] http://www.switchboard.com
[3] http://www.geographynetwork.com
[4] United States Geological Survey, "Cities and Towns of the United States," (2004). Available online: http://nationalatlas.gov/atlasftp.html.
[5] United States Geological Survey, "Roads of the United States Data Set," (1999). Available online: http://nationalatlas.gov/roadsm.html.
[6] United States Geological Survey, EROS Data Center, "North America Shaded Relief (3rd ed.)," (2003). Available online: http://nationalatlas.gov/atlasftp.html.
[7] United States Census Bureau, "Population data," (2000). Available online: http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=DEC&_lang=en&_ts.
[8] United States Census Bureau, "Cartographic Boundary Files," (2000). Available online: http://www.census.gov/geo/www/cob/bdy_files.html.

- Census Tract
- Census Block Groups
- Zip Code
- Population by Census Block Groups
- Population by Age
- Population by Sex

We also obtained the number of Medicaid eligibles in each Wyoming County from the Medicaid Query Path database.

ArcMap allows us to place circles around points on a map to illustrate the area covered by a given distance in miles. We used this feature in ArcMap to illustrate travel distance around the locations of providers. We chose to show two circles around each provider to represent distance requirements for the categories of communities A-F. The areas of Wyoming that fall within the area of the circles represent towns that fall within the guidelines of access for core services. Towns in areas outside the circles do not meet the access requirements for the core services.