Using GIS to Identify Independent Rural Pharmacies Vulnerable to Changes in Medicare Policy

6th Annual ESRI International Health Users GIS Conference
Fire Sky Resort and Spa
Scottsdale, Arizona
October 7-10, 2007

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University of Nebraska Medical Center

Project Goals

- To establish an affordable, easily accessible and comprehensive geographically registered pharmacy database for researchers.

- Database would include:
  - All U.S. pharmacies (74,000+)
  - Select demographic and community data at varying levels of geography
  - Ability to classify pharmacies by type and by relation to multiple definitions of rurality.

Why is there a concern?

- Pharmacists provide clinical services important in the continuum of care, including:
  - Dispensing medications
  - Counseling patients
  - Detecting potential threats to patient safety (such as contra-indicated medications, wrong dose prescriptions)
  - Supporting other providers, such as providing pharmacy oversight in local hospitals and skilled nursing facilities.
  - Detecting a possible public health threat in its early stages.

Why is there a concern?

- Pharmacy services are vital to meeting the needs of any population, including residents of rural places.
- The role of prescription medications in sustaining favorable health status has become more obvious in recent years due to the increases in expenditures for medications and, more recently, the addition of a prescription drug benefit to the Medicare program.
- Very little is known, however, about the infrastructure for delivering pharmaceutical services to rural Americans. This study focuses on one part of that infrastructure, independently owned pharmacies that are the only retail outlet in their communities.

Summary of importance to the community

- Open 60 hours per week
- Annual sales of $3.75 million

Data from National Community Pharmacists Association-Pfizer Digest-In-Brief, 2006

Data Base Used

- Data for this project were obtained from the National Council for Prescription Drug Programs (NCPDP).
- Contains data elements that have been defined and approved by the Maintenance and Control (MC) Work Group of the NCPDP, the data base contains over 70,000 pharmacies.
- NCPDP also enumerates non-pharmacy entities authorized to dispense prescriptions in the United States as part of NCPDP's Non-Pharmacy Dispensing Site Numbering System.
- These are all pharmacies that have a NCPDP Provider Identification Number which is used in their interactions with pharmacy payers and claims processors. The NCPDP Provider ID is a seven-digit numbering system that is assigned to every licensed pharmacy and qualified Non-Pharmacy Dispensing Site (NPDS) in the United States.

Data Base Used

- Using the NCPDP approved provider taxonomy; pharmacies self-identify themselves by selecting one of five Primary Business Codes:
  - Independent
  - Chain
  - Alternate Dispensing Site
  - Franchise
  - Government.

Data Base Used

- The pharmacies then identify themselves by type:
  - Community retail
  - Long term care
  - Mail order
  - Home infusion
  - I/T/U
  - Veterans Health Administration
  - Institutional
  - Managed care
  - Clinic
  - Specialty
  - Public health
  - Military.

Methodology

- Using SAS software we classified the pharmacies into 3 categories; Independent, Chain, or Other.
- Next we identified the pharmacies as either retail or other to identify the final pharmacies of interest – independently owned retail pharmacies.
- The final data base was then imported into the ArcGIS 9.2 geographic information system or GIS (ESRI, 2005). Using ESRI's Streetmap USA files (ESRI, 2006), U.S. Census Place files, U.S. Census ZCTA files and U.S. Census County files (http://www.census.gov/geo/www/cob/index.html) the pharmacies were then geocoded using a cascade methodology.
  - This method allowed for a quick yet accurate matching of addresses by geocoding to the exact address first, if unsuccessful then to place or community, if unsuccessful then to the centroid of the ZIP code and finally if unsuccessful at that level, to finally geocode to the centroid of the county.

Methodology

- Once geocoding was completed the resulting maps were overlain on a map created from a list of Census tracts, townships and zip codes which had been defined as rural for the purposes of funding by the Office of Rural Health Policy

  (ftp://ftp.hrsa.gov/ruralhealth/Eligibility2005.pdf).

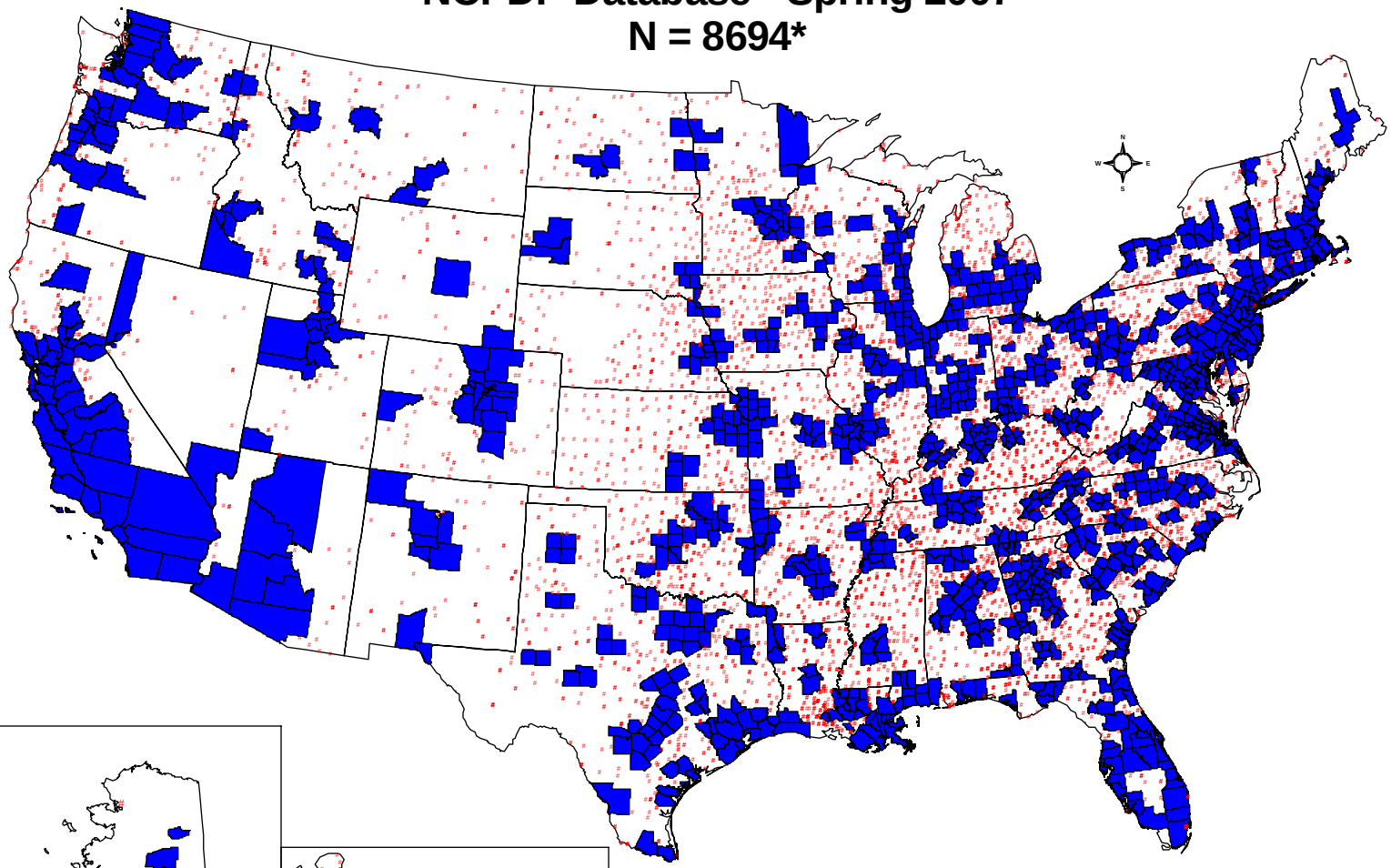
Methodology

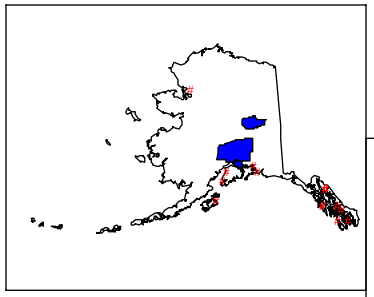
- With the exact location of the rural retail pharmacies completed the GIS was then used to identify those pharmacies that were the sole retail provider in their community.
- Also identified were those pharmacies that were not only the sole retail pharmacist in a community but if they were also the sole retail pharmacy within a ten mile Euclidian buffer of that community.
- Once these categories of pharmacy were completed we produced national and state level maps showing the distribution pharmacies that were the sole independent rural, including those within a 10 mile buffer

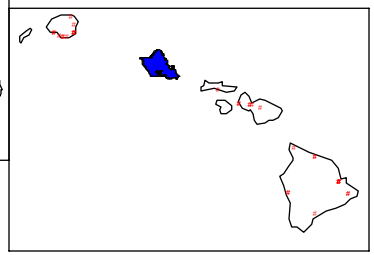
Early results from current work

- ***Question***: How extensive is reliance on independently owned pharmacies in rural America?
- Key definition
  - ***Rural:*** areas designated as rural for purposes of participation in programs supported by the Federal Office of Rural Health Policy.[1]
  - ***Reliance***: There is only pharmacy in the community, and it is independently owned.[2]
- ***Answer***: Independently owned pharmacies are the only local pharmacy in many rural communities.
  - [1] Rural-urban commuting areas are used to designate rural places within metropolitan areas
  - [2] The residents of the community have only one retail option within that community. They could have choices in nearby communities and/or they could use mail order for maintenance medication.

Independent Rural Pharmacy Locations, NCPDP Database - Spring 2007 N = 8694*







Note: Alaska and Hawaii are not to scale.

Rural Independent Pharmacies

Metropolitan Counties

Rural Independent Pharmacy Location

Source: NCPDP, 2007

*Note: 11% of the entire national database did not geocode thus is not shown in this or following maps.

RUPRI Center for Rural Health Policy Analysis, 2007

What are we talking about?

- Local: no other pharmacy in the same community
- No other pharmacy within 10 miles
- Independent: not chain or institutional
- Approximately 1000

How many and where are they located?

What are the numbers in our study area?

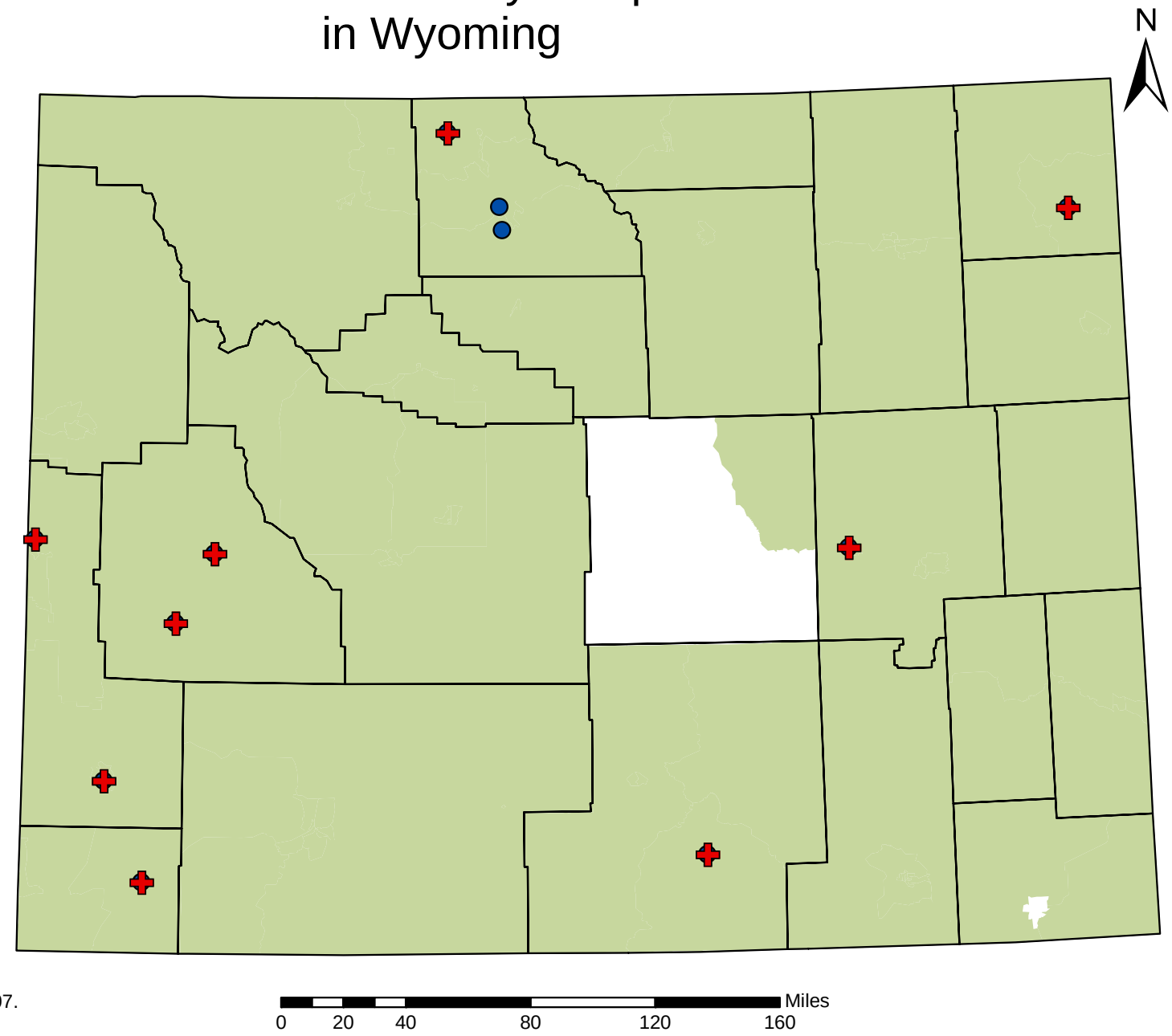
TABLE 1 Select National and State rural pharmacies by type and location

	Total rural independent pharmacies	Sole rural community pharmacies	Sole community pharmacies at least 10 miles from another pharmacy
United States	7455	2019	1044
Arkansas	261	54	23
Nebraska	147	57	53
Pensylvania	247	74	18
Wyoming	44	11	9

What are the numbers in our study area?

- As seen in the following maps, rural independents in four sample states include a number that are the only pharmacy in a ten mile radius
  - in a Mountain West frontier state (Wyoming)
  - a southern state (Arkansas)
  - a midwestern state with both frontier area and more densely populated rural areas (Nebraska)
  - and an eastern state with large metropolitan areas (Pensylvania).

Location of Sole Rural Community Independent Pharmacies in Wyoming



ORHP Rural-Urban Typology

- Urban
- Rural

Sole Independent Rural Pharmacies

- 10 Miles or More From Any Other Retail Pharmacy
- Within 10 Miles of Another Pharmacy

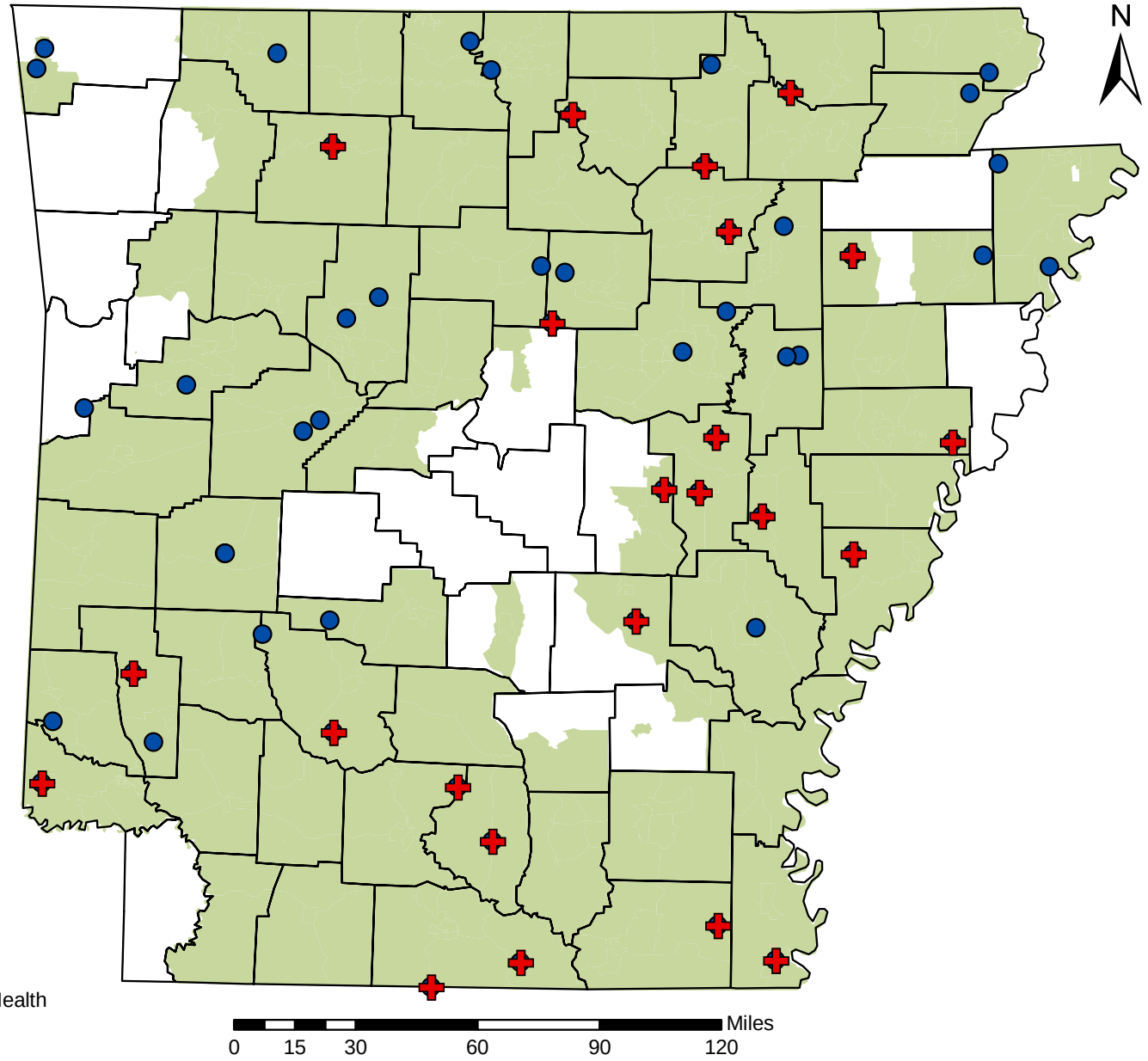
Note: Sole independent pharmacy is the only pharmacy in a community and is independently owned.

Source of provider data: National Council for Perscription Drug Programs, 2007.

Source of Rural designations: Office of Rural Health Policy, HRSA, 2005.

Produced by: RUPRI Center for Rural Health Policy Analysis, 2007.
Cartography by: Nicole Vanosdel

Location of Sole Rural Community Independent Pharmacies in Arkansas



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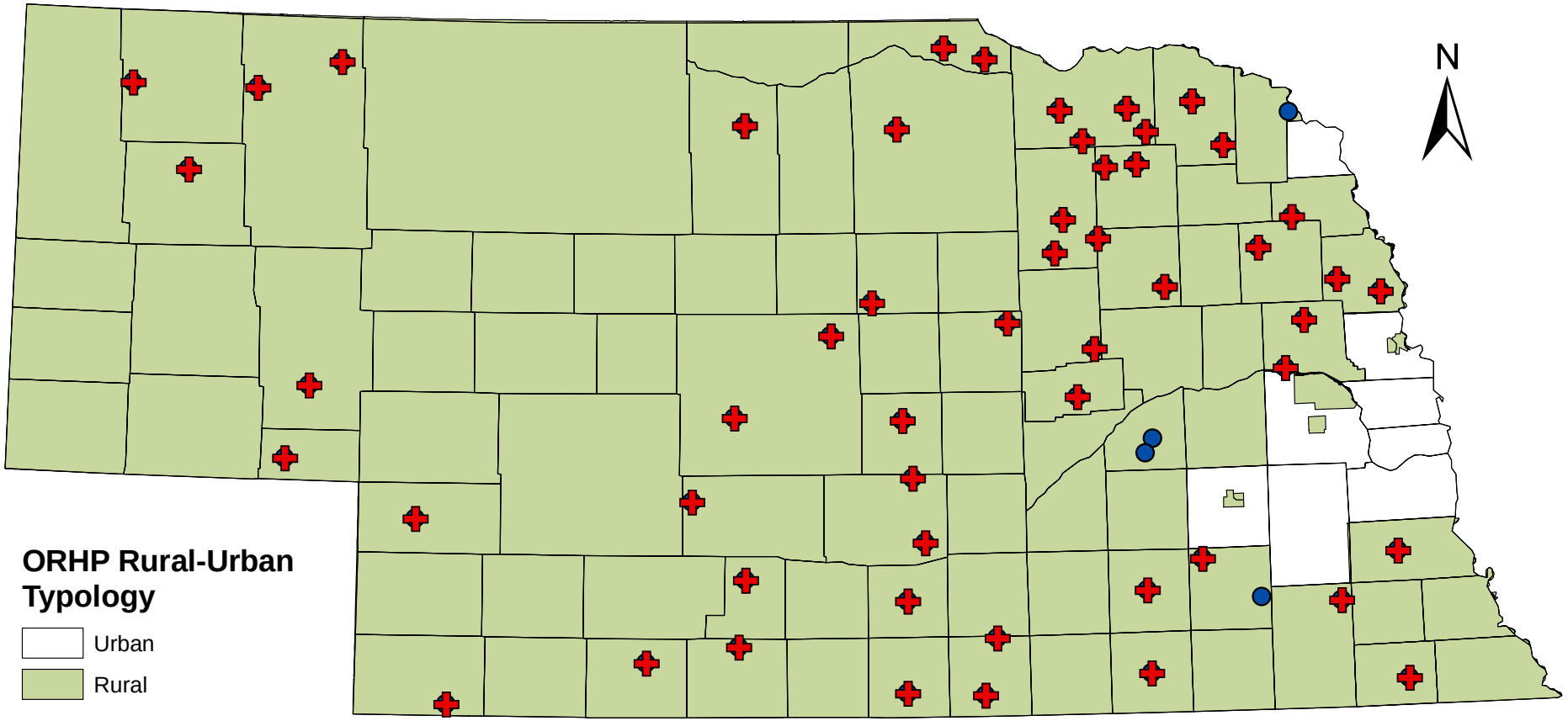
Cartography by: Nicole Vanosdel

Location of Sole Rural Community Independent Pharmacies in Nebraska



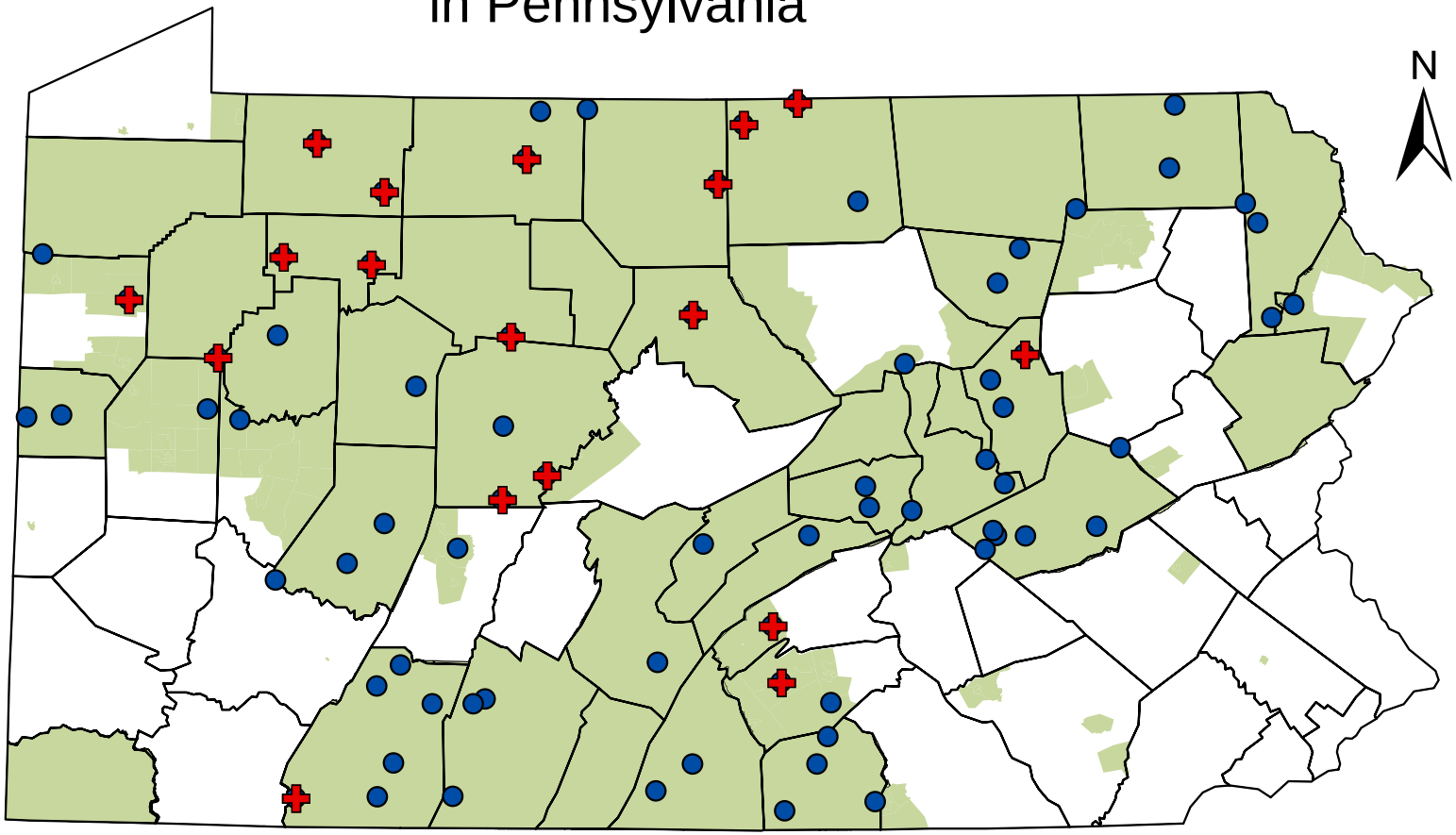
Note: Sole independent pharmacy is the only pharmacy in a community and is independently owned.

Source of provider data: National Council for Perscription Drug Programs, 2007.

Source of Rural designations: Office of Rural Health Policy, HRSA, 2005.

Produced by: RUPRI Center for Rural Health Policy Analysis, 2007. Cartography by: Nicole Vanosdel

Location of Sole Rural Community Independent Pharmacies in Pennsylvania



ORHP Rural-Urban Typology

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- Rural

Sole Independent Rural Pharmacies

- 10 Miles or More From Any Other Retail Pharmacy
- Within 10 Miles of Another Pharmacy

Note: Sole independent pharmacy is the only pharmacy in a community and is independently owned.

Miles
0 15 30 60 90 120

Source of provider data: National Council for Perscription Drug Programs, 2007.

Source of Rural designations: Office of Rural Health Policy, HRSA, 2005.

Produced by: RUPRI Center for Rural Health Policy Analysis, 2007. Cartography by: Nicole Vanosdel

Discussion

- We have used the NCPDP data to show the location of independently owned pharmacies in rural communities wherein they are the only retail pharmacy.
- A limitation of this study is that the data may not reflect recent closures of independently owned pharmacies that have retained their provider number for purposes of continuing to receive payment.
- Therefore, there may be fewer communities with *any* local retail pharmacy than we reflect, although that number is expected to be minimal.
- Because the data are based on the provider number used for payment, we are confident the maps are not missing any pharmacies in business as of July of 2007.
- The maps do not show all pharmacies in each state, including chain pharmacies. However, we included chain pharmacies when determining where there was only one pharmacy in a community, and when developing 10-mile buffers around the sole independent community pharmacies.

Discussion

In communities with only one retail pharmacy, many of those services exist only because that pharmacy is in business.

Threats to the viability of the local independent pharmacy, such as a shortage of pharmacists, difficulties recruiting to rural areas, and payment policies challenging the financial viability of pharmacy businesses, threaten local access to an important service in those places reliant on a single independent pharmacy.

Data presented in this presentation illustrate the scope of a potential problem in access to services. Additional research (some of which is underway in the work plans of rural health research centers)[1] will help further understand which of these pharmacies are essential to health care because there are no other alternatives nearby, or the alternatives within close proximity are also independently owned, and forces that threaten one threaten all.

[1] http://www.ruralhealthresearch.org/

Along comes Part D

- Change in source of payment
  - Patient to Medicare (private)
  - Medicaid to Medicare (private)
  - Medicare to Private
  - Multiple commercial vendors
  - A confused patient base

Early fears and experiences

- 89% of those surveyed by National Community Pharmacists Associated reported being owed at least $20,000 from Medicare PDPs
- 55% reported needing outside loans
- 65% of those surveyed by National Council of State Pharmacy Associate Executives reported lower profit margins
- 59% reported working longer hours

What is at risk?

A story from North Carolina: local pharmacy being forced to close when next nearest one is 15 miles away

- A link in the continuum of care

An exploration of issues

- Interviews of 25 pharmacists in 10 states
- Purpose of a special study conducted by UNC and RUPRI was to learn the issues, not measure prevalence

Key issues

- Signing contracts
- take it or leave it
- some negotiation
- few local pharmacists selected 90 day option because of low payment
- Limited contact regarding payment delays and mediation therapy management
- General difficulty communicating (time on hold, reaching someone with inadequate knowledge to deal with the specific questions)

Reimbursement

- Little change in total revenues, increase in volume balanced by reduction in payment
- Reduction in percent payment from cash and Medicaid: as much as 60 percentage points for Medicaid and 35 for cash

Confirmation from larger survey

- Kaiser Family Foundation survey of pharmacists in April-July, 2006
- 53% reported Part D caused “a lot” of administrative burdens
- 27% of independent pharmacists reported taking out a loan or line of credit

Further Applications for the GIS

- Availability of pharmacy insurance in rural areas
- Types of programs available
- Pharmacy openings and closures over time
- # of Pharmacies by rural typology
- Pharmacy accessibility in relation to community characteristics

Future Home and Uses for the GIS

- Maps and reports available upon request.
- Based on a researcher accessible web server
  - User ID access protocols?
  - Apply for free access?
- Policy research
- Policy development

Supporting Research Institutions

- North Carolina Rural Health Research and Policy Analysis Center, University of North Carolina, Chapel Hill, N.C.
  - Topic of Concentration: Federal Insurance Programs (Medicare and Medicaid) and Their Effect on Rural Populations and Providers
  - Past and current research includes:
    - Describing Geographic Access to Physicians in Rural America Using Statistical Applications in GIS
    - Development of a New Methodology for Dental Health Professional Shortage Area Designation
    - Impact of The Medicaid Budgetary Crisis on Rural Communities: A 50-State Survey

Supporting Research Institutions

- RUPRI Rural Health Panel
  - The Rural Policy Research Institute's Rural Health Panel provides decision makers with timely, objective, and expert analysis of the implications of policy for rural health.

  - **Rural Health Panel - People**
    - Andrew F. Coburn
      PROFESSOR
      Maine Rural Health Research Center
      Edmund S. Muskie Institute of Public Affairs, University of Southern Maine A.
    - Clinton MacKinney
      BOARD-CERTIFIED FAMILY PHYSICIAN
    - Timothy D. McBride
      PROFESSOR OF HEALTH MANAGEMENT AND POLICY
      School of Public Health
      St. Louis University
    - Keith Mueller
      DIRECTOR
      RUPRI Center for Rural Health Policy Analysis
      University of Nebraska Medical Center
    - Rebecca T. Slifkin
      DIRECTOR
      North Carolina Rural Health Research & Policy Analysis Center
      Cecil G. Sheps Center for Health Services Research
    - Mary K. Wakefield
      DIRECTOR
      Center for Rural Health
      University of North Dakota School of Medicine and Health Sciences

Funding Organizations

- Federal Office of Rural Health Policy – Health Resources and Services Administration
  - www.ruralhealth.hrsa.gov/
- Rural Policy Research Institute
  - www.rupri.org/healthpolicy/
- Nebraska Center for Rural Health Research.
  - www.unmc.edu/rural
- University of Nebraska Medical Center
  - www.unmc.edu

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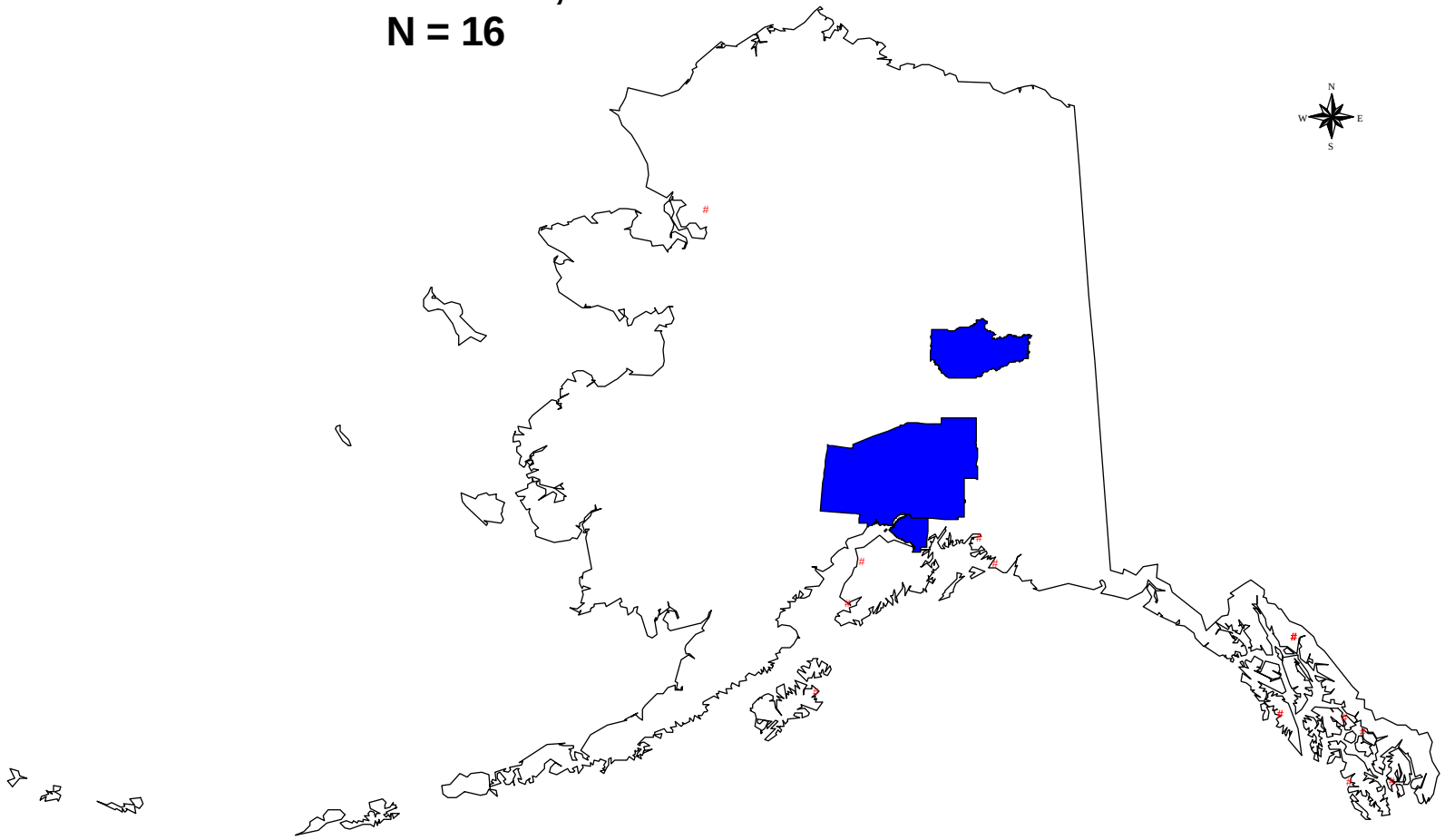
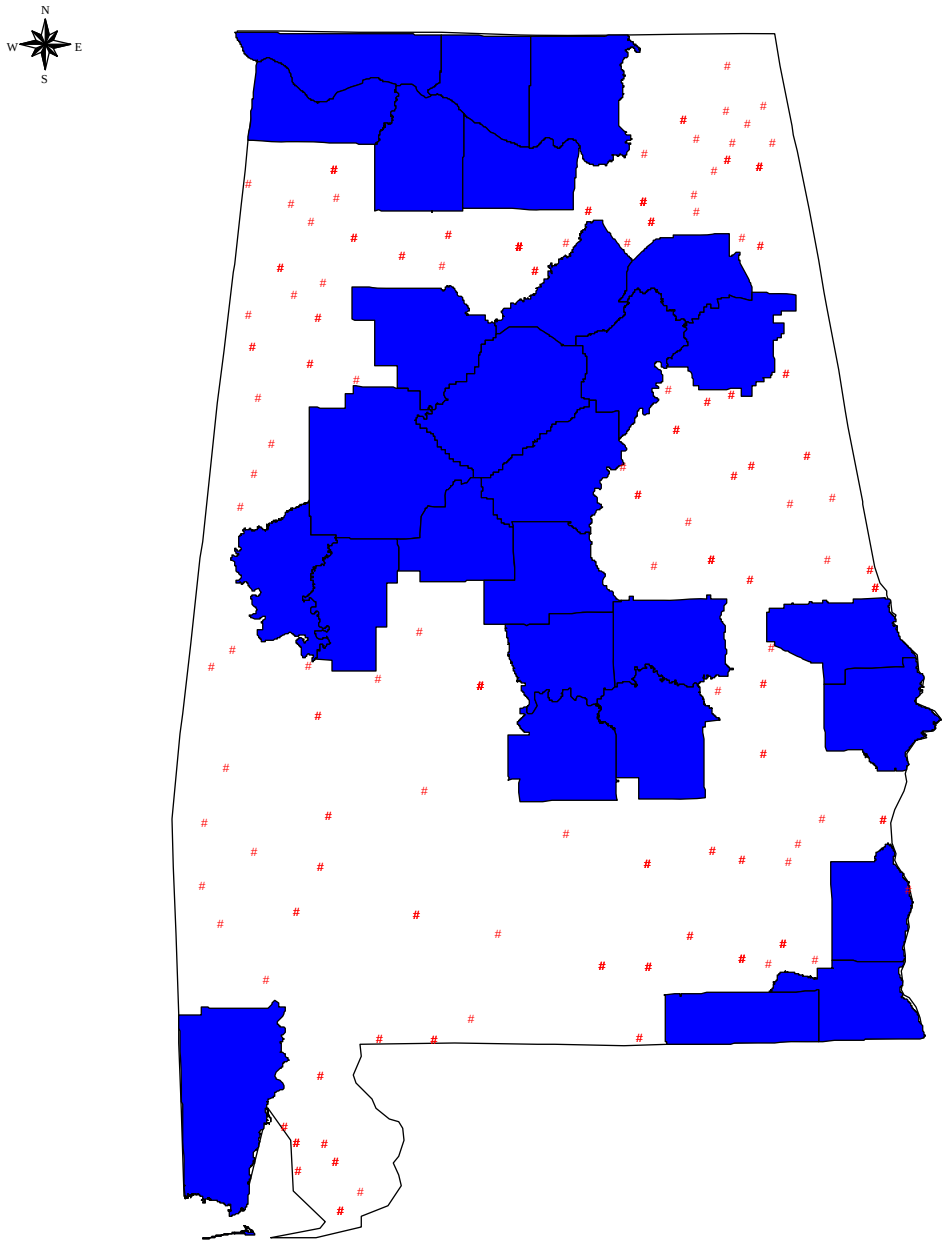
  - www.unmc.edu/rural
  - www.rupri.org/healthpolicy

Alaska Rural Independent Pharmacy Locations
NCPDP Database, 2007
N = 16



Source: NCPDP, 2007

RUPRI Center for Rural Health Policy Analysis, 2007



Alabama Rural Independent Pharmacy Locations NCPDP Database, 2007 N = 229

0 50 100 150 Miles

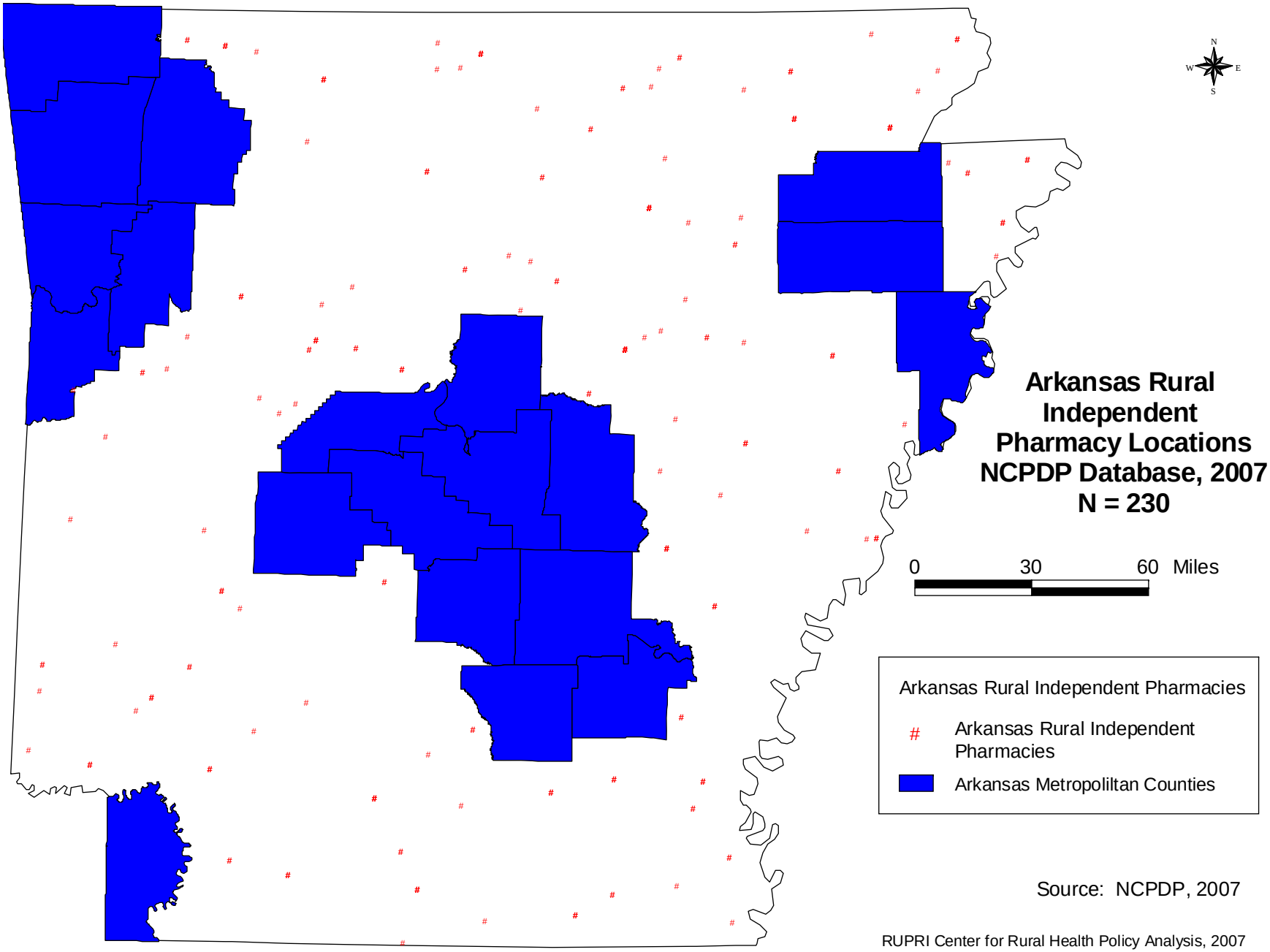
Alabama Rural Independent Pharmacies

Alabama Rural Independent Pharmacies

Alabama Metropoliltan Counties

Source: NCPDP, 2007

RUPRI Center for Rural Health Policy Analysis, 2007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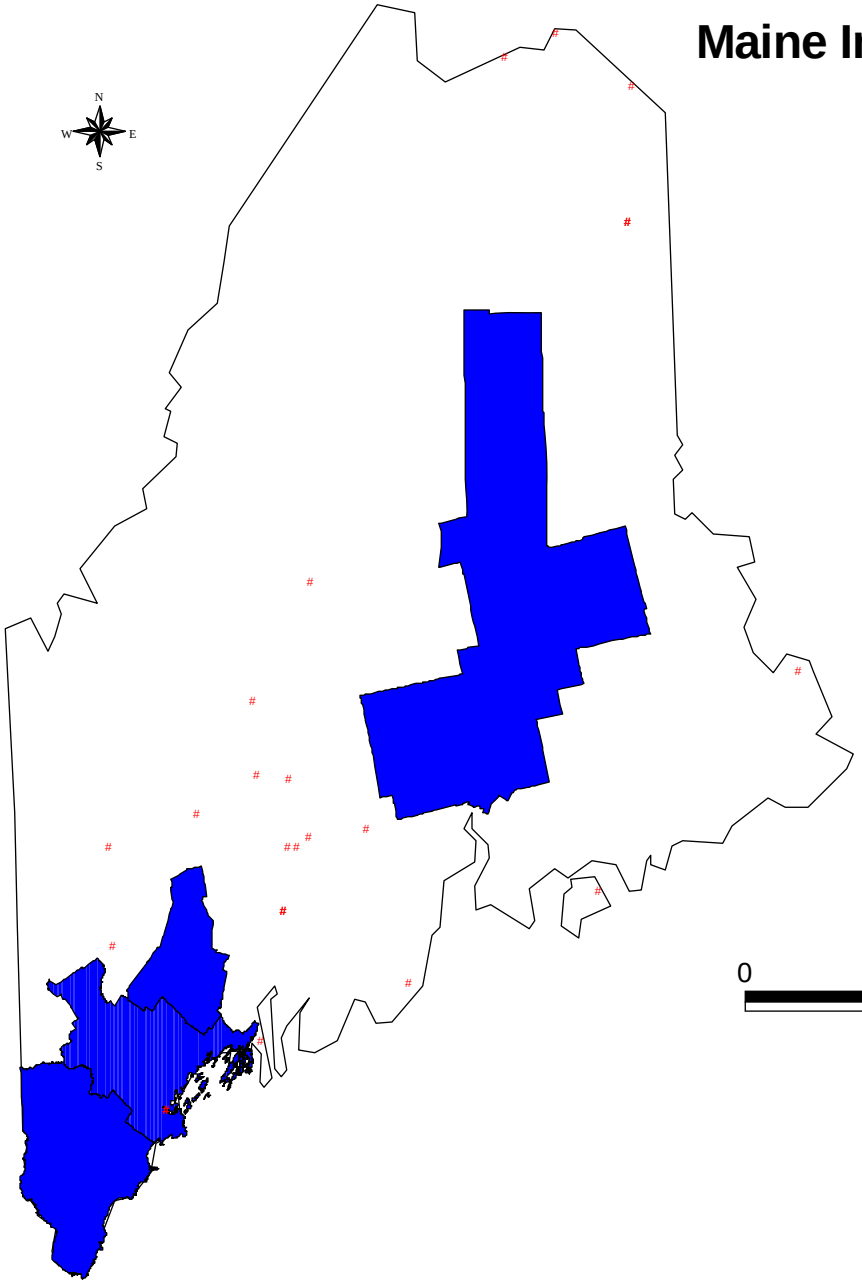
S
Arkansas Rural Independent Pharmacy Locations NCPDP Database, 2007 N = 230
0
30
60 Miles
Arkansas Rural Independent Pharmacies
Arkansas Rural Independent Pharmacies
Arkansas Metropoliltan Counties
Source: NCPDP, 2007
RUPRI Center for Rural Health Policy Analysis, 2007

Maine Independent Rural Pharmacy Locations
NCPDP Database, 2007
N = 26



Maine Rural Independent Pharmacies

\# Maine Rural Independent Pharmacies

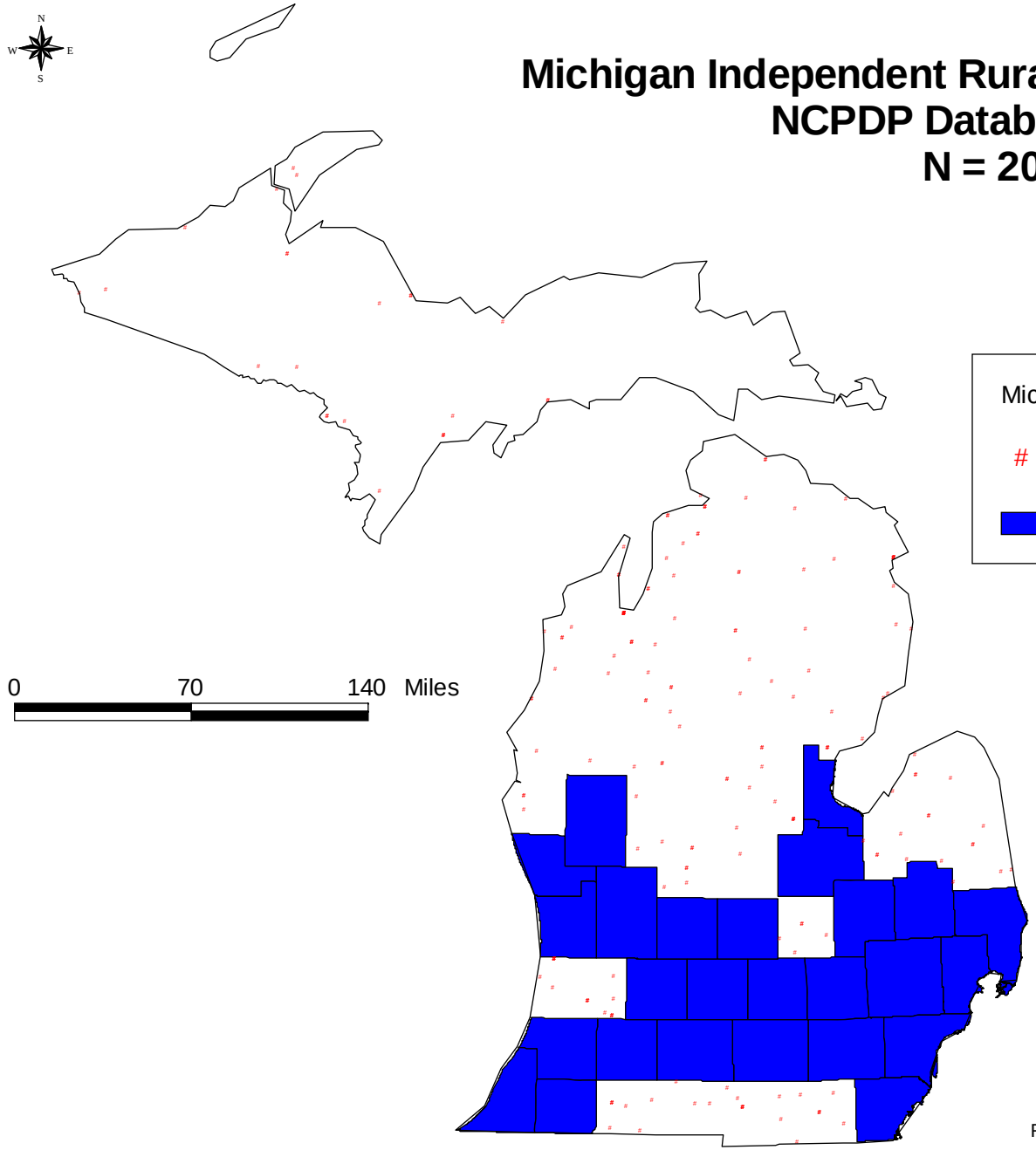
Maine Metropoliltan Counties

0 60 120 180 Miles

Source: NCPDP, 2007

RUPRI Center for Rural Health Policy Analysis, 2007

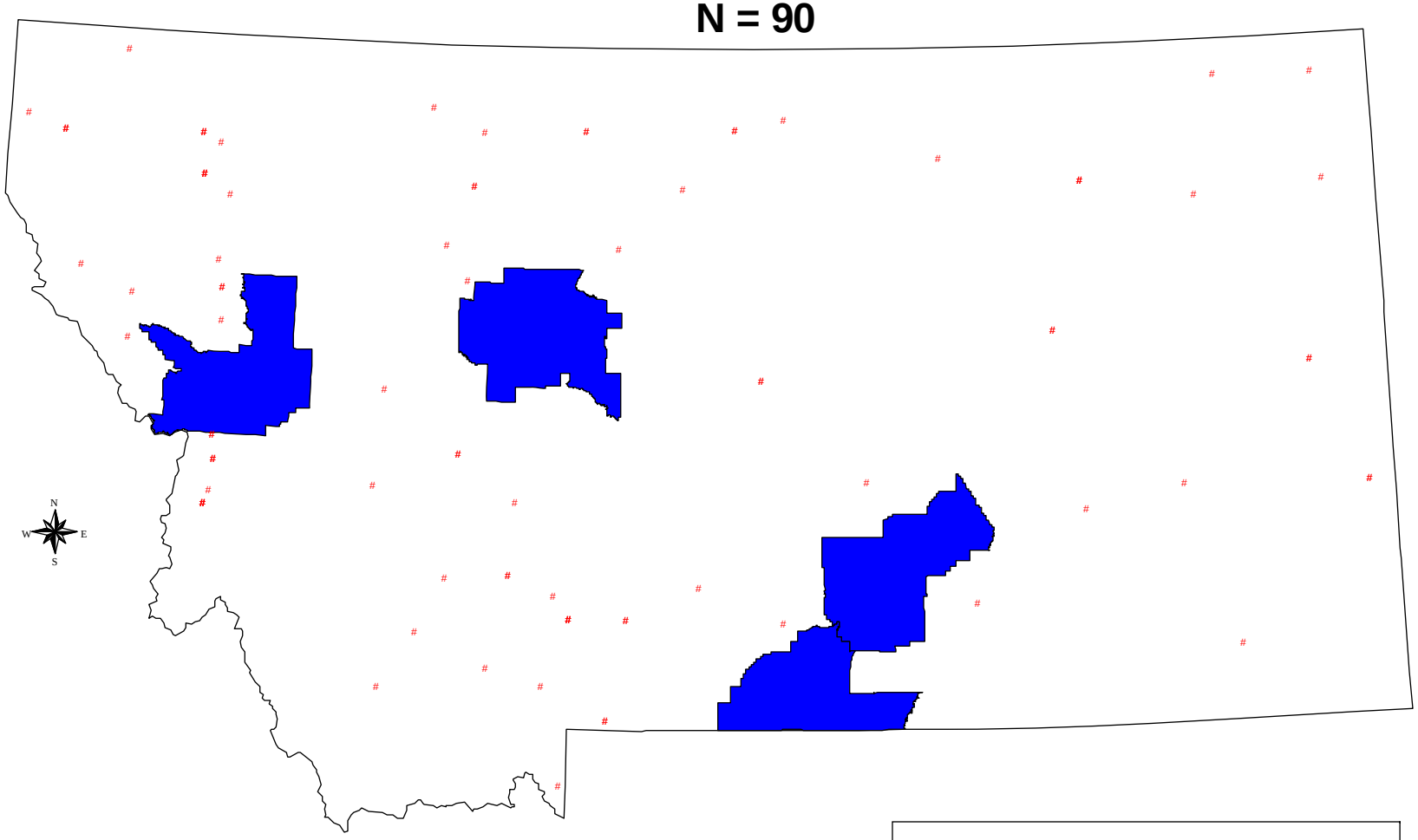
Michigan Independent Rural Pharmacy Locations
NCPDP Database, 2007
N = 200



Source: NCPDP, 2007

RUPRI Center for Rural Health Policy Analysis, 2007

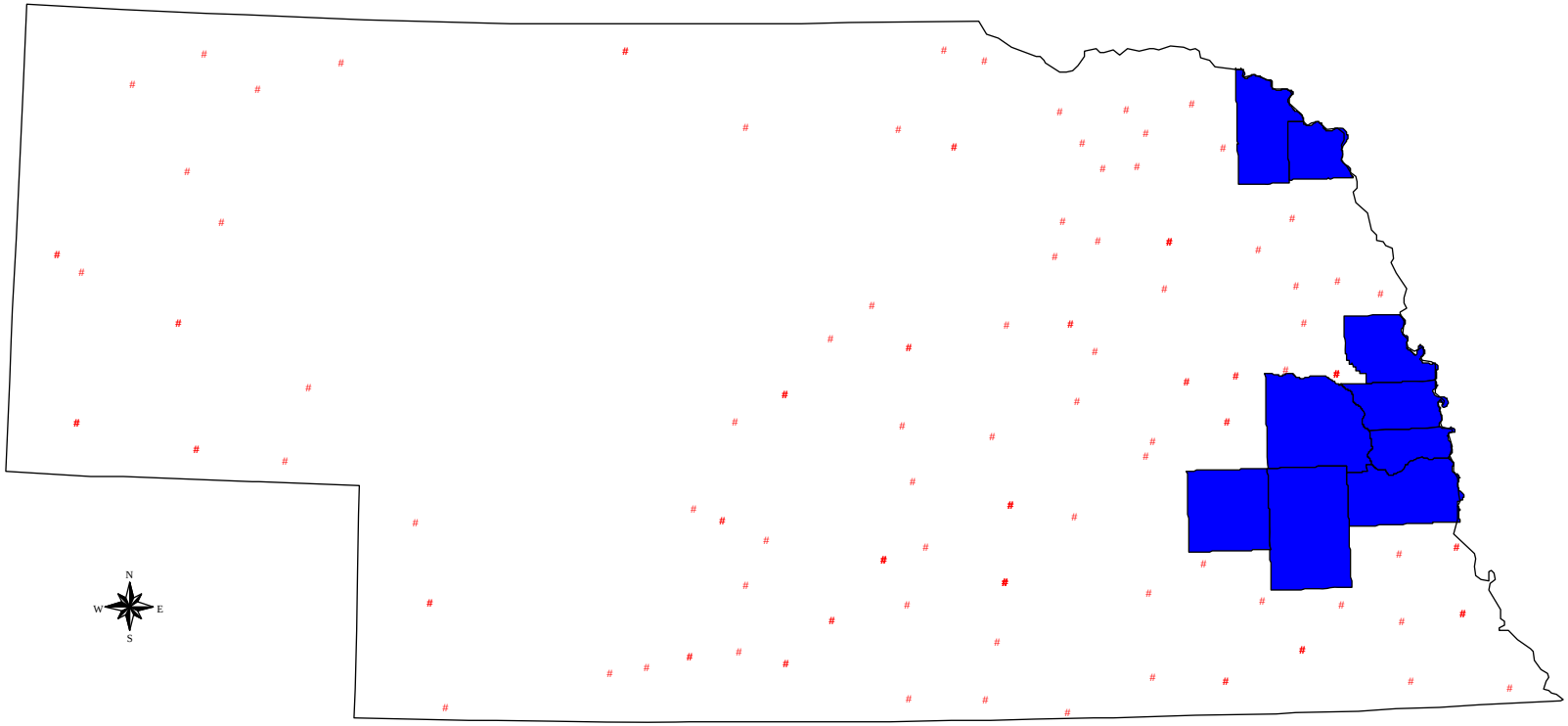
Montana Rural Independent Pharmacy Locations
NCPDP Database, 2007
N = 90



Source: NCPDP, 2007

RUPRI Center for Rural Health Policy Analysis, 2007

Nebraska Rural Indpendent Pharmacy Locations
NCPDP Database, 2007
N = 138



Nebraska Rural Independent Pharmacies

Nebraska Rural Independent Pharmacies

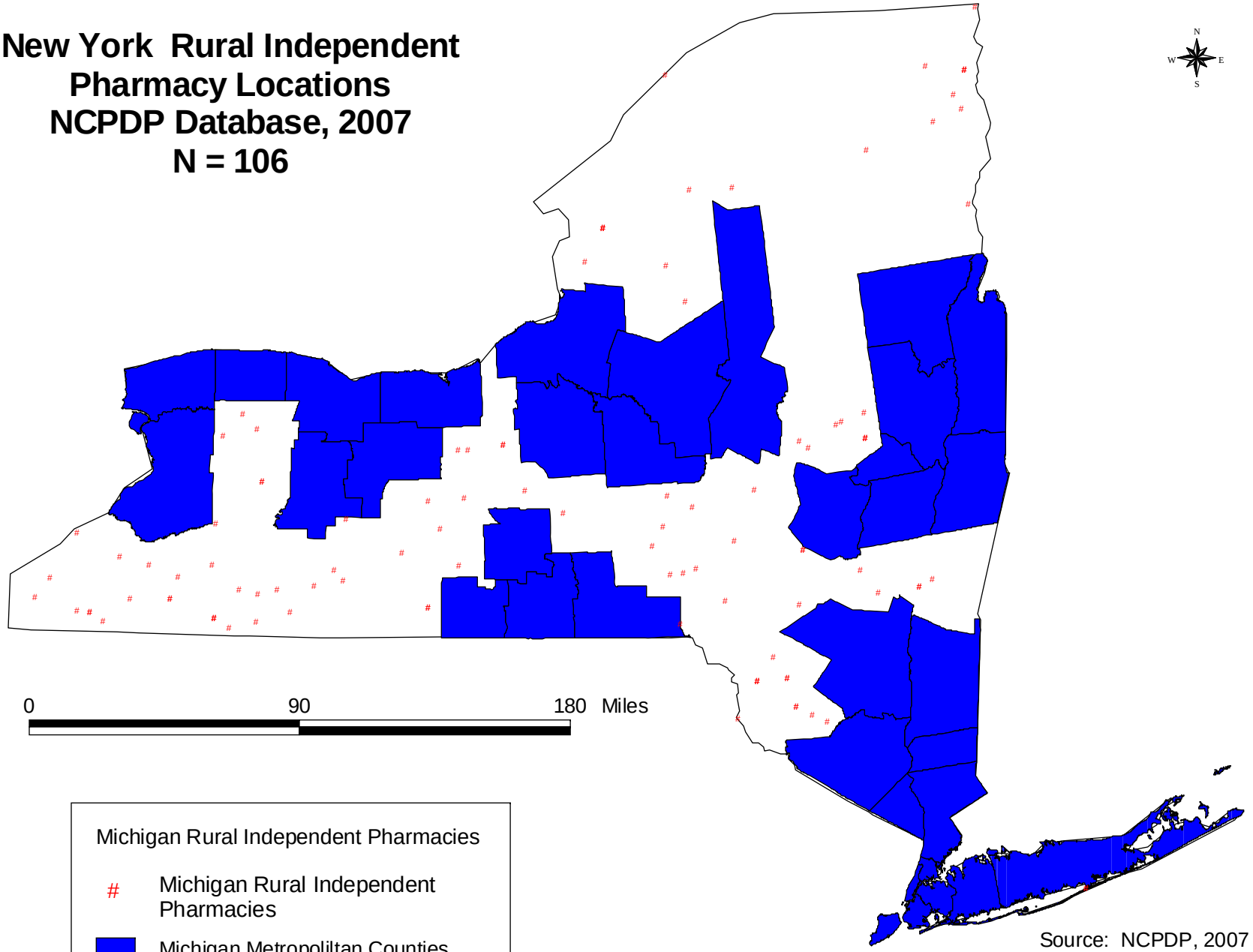
Nebraska Metropoliltan Counties

0 90 180 Miles

Source: NCPDP, 2007

RUPRI Center for Rural Health Policy Analysis, 2007

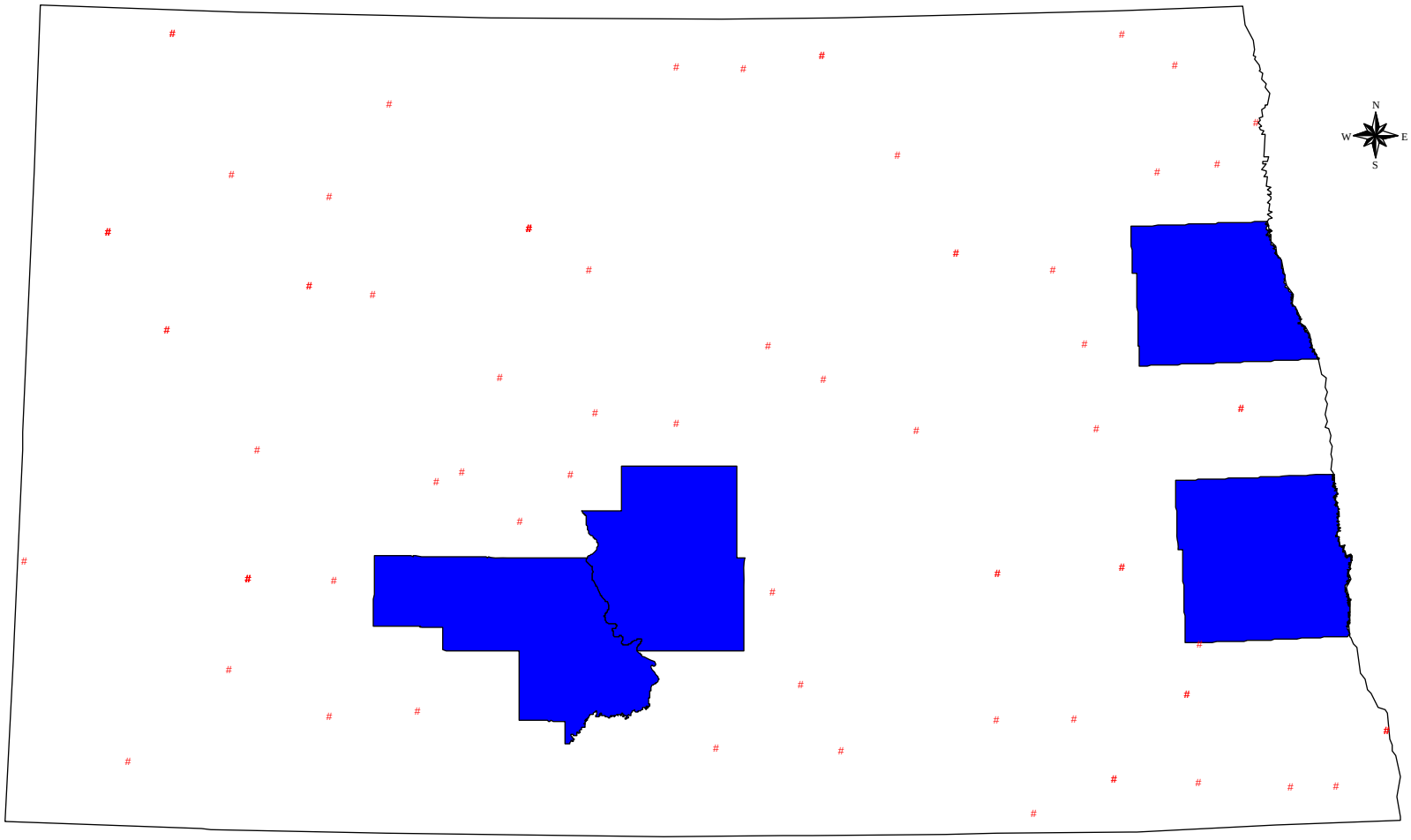
New York Rural Independent Pharmacy Locations NCPDP Database, 2007 N = 106



Source: NCPDP, 2007

RUPRI Center for Rural Health Policy Analysis, 2007

North Dakota Rural Independent Pharmacy Locations
NCPDP Database, 2007 N = 82



North Dakota Rural Independent Pharmacies

North Dakota Rural Independent Pharmacies

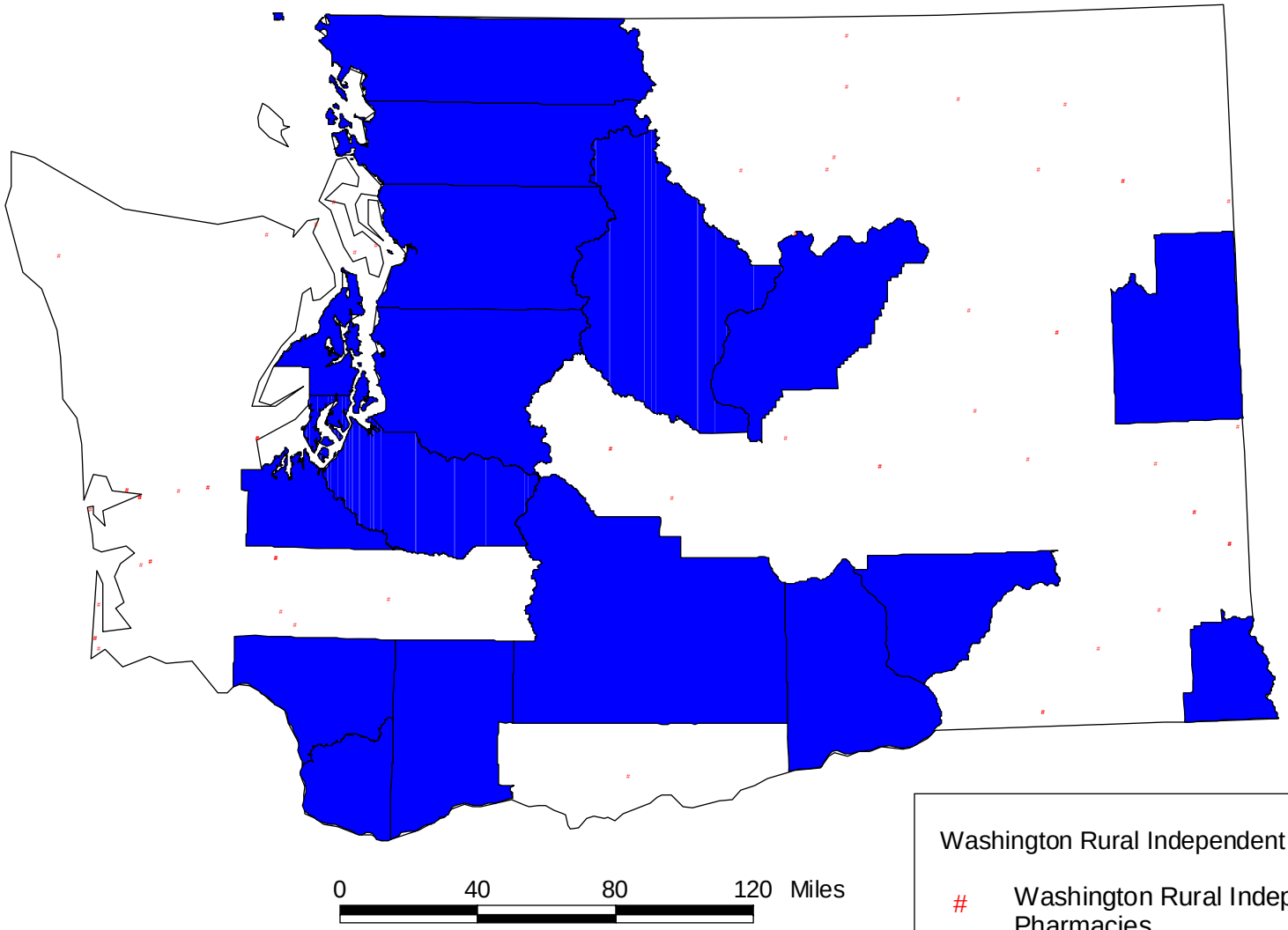
Northh Dakota Metropoliltan Counties

0 30 60 90 120 Miles

Source: NCPDP, 2007

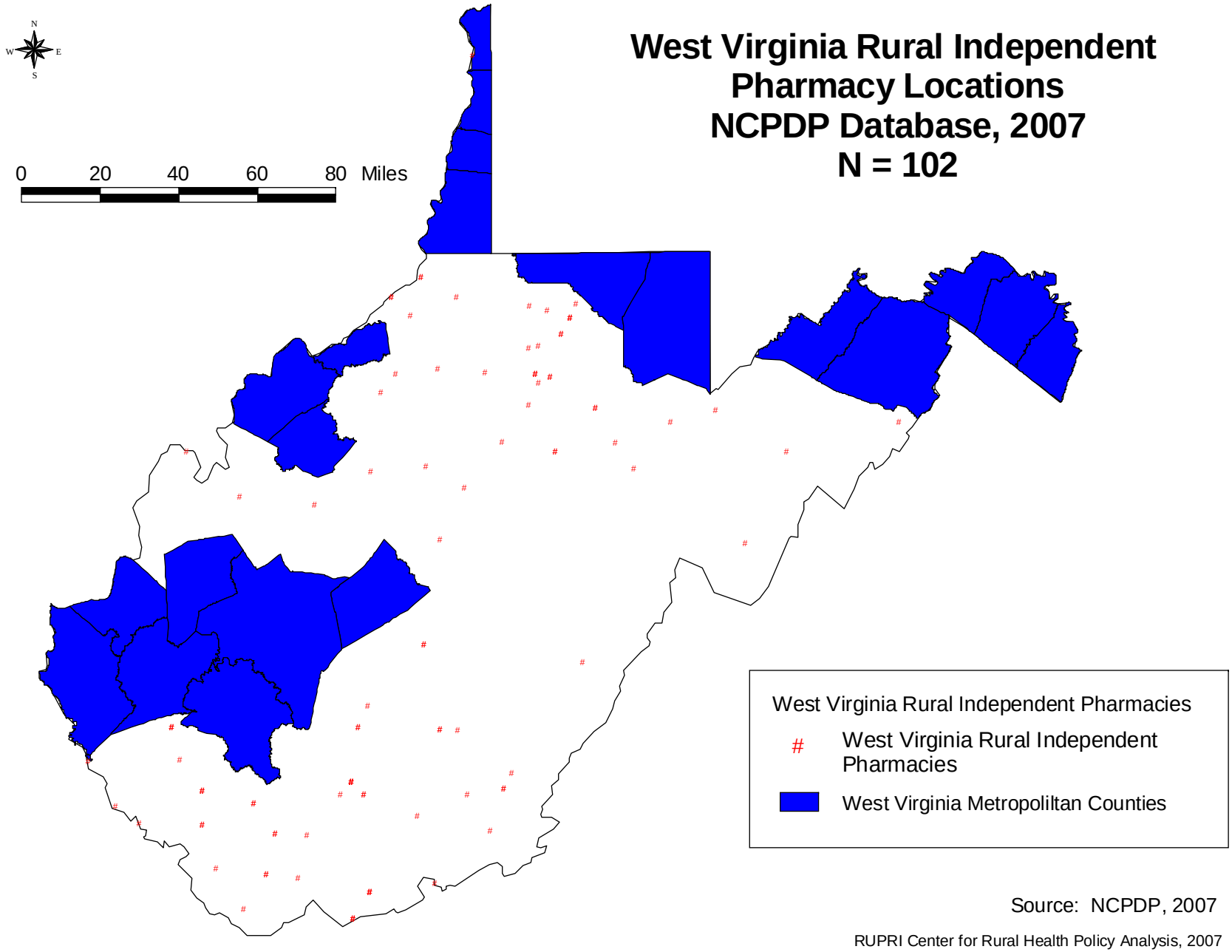
RUPRI Center for Rural Health Policy Analysis, 2007

Washington Rural Independent Pharmacy Locations
NCPDP Database, 2007
N = 66



Source: NCPDP, 2007

RUPRI Center for Rural Health Policy Analysis, 2007



Source: NCPDP, 2007

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