



West Virginia Hospital Service Areas Analysis Using GIS

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Authority

Overview

- Introduction
- Methodology
- Result
- Conclusion
- Future Goals

Introduction

- WVHCA has two primary purposes:
 - Constrain the rising cost of health care
 - Assure reasonable access to necessary health services.
- Certificate of Need is one of the divisions that oversees these purposes carried out on a daily basis.

Introduction (cont.)

- The aim of this project is to illustrate the population-based quantifiable need methodology by examining the 25/10 rule for determining a hospital's service area.
- All 62 hospitals in WV were mapped to see which counties each hospital could count as either 25% or 10% service area.

Certificate of Need

- Deals with cost containment measures.
- Makes sure that services are not being duplicated.
- Review process of determination of need and financial feasibility.
- Is one of only 36 states (plus Washington D.C.) to have some form of a CON Process.

CON Process

- Health care providers must obtain a CON before they can do any of the following:
 - Adding or expanding health care services.
 - Exceeding the capital expenditure threshold of two million dollars.
 - Obtaining major medical equipment valued at two million dollars or more.
 - Developing or acquiring new health care facilities.

25/10 Rule

- A county wherein at least 25% of the residents rely or will rely on the acute care services in the county of proposal
- A county which generates at least 10% of the patient load in the county of proposal.

Methodology

- ArcGIS Desktop was main GIS component used.
- Hospital Discharge By County Spreadsheet
- West Virginia counties shapefile provided by ESRI

First Phase - Highlight Counties that Meet 25/10

- Color-coded counties in shapefile that met either the 25% or 10% criteria.
 - 25% = Blue and 10% = Green
- Highlighted counties that met both 25% and 10% criteria.
 - Striped Black Color

FID	Shape ^	OBJECTID	NAME	STATE_NAME	STATE_FIPS	CNTY_FIPS	FIPS	AREA	POP1990	POP2000	POP90_SQMI	Shape_Leng	Shape_Area
13	Polygon	1143	Jefferson	West Virginia	54	037	54037	209.2304	35926	42953	172	1.144912	0.056603
14	Polygon	1145	Pleasants	West Virginia	54	073	54073	140.9024	7540	7542	54	0.954203	0.030160
15	Polygon	1146	Harrison	West Virginia	54	033	54033	424.984	60371	70010	163	1.49861	0.1149
16	Polygon	1150	Doddridge	West Virginia	54	017	54017	324.8405	8994	7488	22	1.329777	0.087765
17	Polygon	1151	Taylor	West Virginia	54	091	54091	173.7457	15144	15376	87	0.935607	0.047011
18	Polygon	1156	Wood	West Virginia	54	107	54107	374.5573	86915	85992	232	1.414464	0.101184
19	Polygon	1159	Ritchie	West Virginia	54	085	54085	440.7333	10233	10569	23	1.560805	0.118988
20	Polygon	1176	Grant	West Virginia	54	023	54023	480.4054	10428	11157	22	1.869942	0.129571
21	Polygon	1185	Barbour	West Virginia	54	001	54001	339.2855	15699	15935	46	1.314344	0.091275
22	Polygon	1188	Tucker	West Virginia	54	093	54093	431.4809	7728	7438	18	1.573778	0.116398
23	Polygon	1197	Hardy	West Virginia	54	031	54031	595.5329	10977	12086	18	1.950052	0.160408
24	Polygon	1216	Wirt	West Virginia	54	105	54105	225.87	5192	5814	23	1.203881	0.06085
25	Polygon	1218	Lewis	West Virginia	54	041	54041	384.8962	17223	17414	45	1.490438	0.103598
26	Polygon	1233	Randolph	West Virginia	54	003	54003	1042.3457	27803	20633	27	3.042224	0.279042
27	Polygon	1235	Upshur	West Virginia	54	097	54097	348.2927	22667	23526	66	1.315469	0.093667
28	Polygon	1236	Gilmer	West Virginia	54	021	54021	340.1181	7669	7134	23	1.362677	0.091543
29	Polygon	1239	Jackson	West Virginia	54	035	54035	400.1036	25900	20613	54	1.725852	0.129033
30	Polygon	1250	Calhoun	West Virginia	54	013	54013	282.8161	7865	7906	28	1.255107	0.076004
31	Polygon	1258	Mason	West Virginia	54	053	54053	442.8085	25178	26096	57	1.870356	0.118877
32	Polygon	1260	Pendleton	West Virginia	54	071	54071	693.62	8054	8003	12	1.815432	0.185991
33	Polygon	1270	Roane	West Virginia	54	087	54087	469.5476	15120	15449	31	1.522546	0.131331
34	Polygon	1284	Braxton	West Virginia	54	007	54007	518.1044	12988	13393	25	1.594636	0.138926
35	Polygon	1316	Webster	West Virginia	54	101	54101	559.0693	10729	9907	19	1.800142	0.149519
36	Polygon	1321	Pocahontas	West Virginia	54	075	54075	944.5259	9008	9071	10	2.449267	0.252047
37	Polygon	1344	Putnam	West Virginia	54	079	54079	346.6802	42635	52744	124	1.320324	0.092737
38	Polygon	1347	Clay	West Virginia	54	015	54015	346.334	9983	10692	29	1.295076	0.092631
39	Polygon	1349	Kanawha	West Virginia	54	039	54039	905.3362	207619	197481	229	2.714387	0.241607
40	Polygon	1359	Cabell	West Virginia	54	011	54011	277.3746	96827	92883	349	1.407724	0.074105
41	Polygon	1366	Nicholas	West Virginia	54	067	54067	646.9917	26775	27516	41	2.227068	0.172551
42	Polygon	1403	Wayne	West Virginia	54	099	54099	525.2464	41636	41749	79	1.794089	0.139815
43	Polygon	1412	Lincoln	West Virginia	54	043	54043	433.9235	21382	22447	49	1.867757	0.115555
44	Polygon	1429	Greenbrier	West Virginia	54	025	54025	1020.6660	34093	35250	34	2.749	0.273052
45	Polygon	1431	Fayette	West Virginia	54	019	54019	682.6912	47952	46447	70	2.060675	0.181439
46	Polygon	1447	Boone	West Virginia	54	005	54005	509.7299	25870	26328	51	2.027067	0.13546
47	Polygon	1497	Logan	West Virginia	54	045	54045	449.5537	43032	39604	96	1.834371	0.119156
48	Polygon	1508	Raleigh	West Virginia	54	081	54081	606.9187	76819	79240	127	2.113084	0.160746
49	Polygon	1509	Mingo	West Virginia	54	059	54059	433.9568	33739	31044	78	1.982759	0.114886
50	Polygon	1530	Summers	West Virginia	54	009	54009	357.9329	14204	13854	40	1.512646	0.094721
51	Polygon	1552	Wyoming	West Virginia	54	109	54109	509.0681	28990	26679	57	1.875425	0.134524
52	Polygon	1574	Monroe	West Virginia	54	063	54063	476.1363	12406	13397	26	1.822414	0.125707
53	Polygon	1608	Mercer	West Virginia	54	055	54055	425.1408	64980	63902	153	1.41139	0.112043
54	Polygon	1617	McDowell	West Virginia	54	047	54047	526.3858	35233	28652	67	1.754566	0.138698

FID	Shape ^	OBJECTID	NAME	STATE_NAME	STATE_FIPS	CNTY_FIPS	FIPS	AREA	POP1990	POP2000	POP90_SQMI	Shape_Leng	Shape_Area
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16	Polygon	1150	Doddridge	West Virginia	54	017	54017	324.8405	8994	7488	22	1.329777	0.087765
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18	Polygon	1156	Wood	West Virginia	54	107	54107	374.5573	86915	85992	232	1.414464	0.101184
19	Polygon	1159	Ritchie	West Virginia	54	085	54085	440.7333	10233	10589	23	1.580805	0.118988
20	Polygon	1176	Grant	West Virginia	54	023	54023	480.4054	10428	11157	22	1.869942	0.129571
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39	Polygon	1349	Kanawha	West Virginia	54	039	54039	905.3362	207619	197481	229	2.714387	0.241607
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53	Polygon	1608	Mercer	West Virginia	54	055	54055	425.1408	64980	63902	153	1.41139	0.112043
54	Polygon	1617	McDowell	West Virginia	54	047	54047	526.3858	35233	28652	67	1.754566	0.138698

Second Phase – Displaying Total Discharges By County

- Create new database that showed hospital discharges by county.
- Join the new database file with the West Virginia shapefile to create new shapefile.

Microsoft Excel - BeckleyAppalachian

Type a question for help

File Edit View Insert Format Tools Data Window Help Adobe PDF

100% Arial

Reply with Changes... Egd Review...

	A	B	C	D	E	F	G	H	I	J	K
1	COUNTY	DISCHARGES									
2	Berkeley	1									
3	Boone	36									
4	Braxton	10									
5	Cabell	2									
6	Clay	2									
7	Fayette	1313									
8	Gilmer	4									
9	Greenbrier	116									
10	Harrison	2									
11	Kanawha	22									
12	Lewis	1									
13	Logan	3									
14	Mason	1									
15	McDowell	56									
16	Mercer	91									
17	Mingo	17									
18	Monongalia	1									
19	Monroe	33									
20	Morgan	1									
21	Nicholas	87									
22	Pendleton	1									
23	Pocahontas	8									
24	Preston	1									
25	Pulnam	1									
26	Raleigh	4043									
27	Roane	1									
28	Summers	242									
29	Wayne	1									
30	Webster	24									
31	Wood	2									
32	Wyoming	807									
33											

BeckleyAppalachian /

Ready NUM

start

11:36 AM

Attributes of 2510WVDischarges

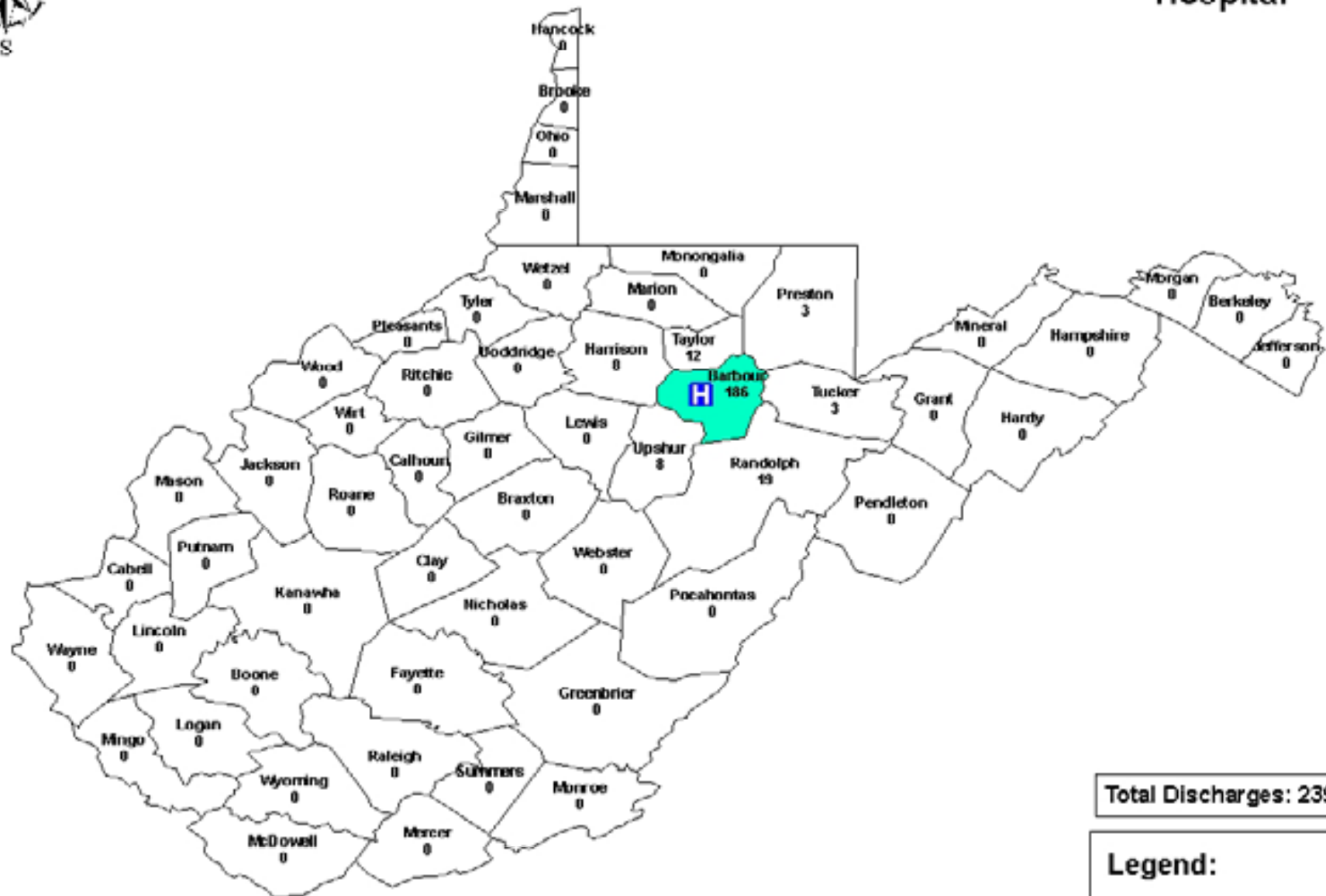
FID	Shape	OBJECTID	NAME	STATE_NAME	DISCHARGES	DISCHARG_1	DISCHARG_2	DISCHARG_3	DISCHARG_4	DISCHARG_5	DISCHARG_6	DISCHARG_7
0	Polygon	887	Hancock	West Virginia	0	0	0	0	0	0	1	
1	Polygon	932	Brooke	West Virginia	0	0	1	0	0	0	2	
2	Polygon	977	Ohio	West Virginia	0	0	0	0	0	1	3	
3	Polygon	1005	Marshall	West Virginia	0	0	0	0	0	0	1	
4	Polygon	1078	Monongalia	West Virginia	1	0	0	1	0	0	8	
5	Polygon	1079	Preston	West Virginia	1	0	0	0	3	0	3	
6	Polygon	1082	Welzel	West Virginia	0	0	0	0	0	1	8	
7	Polygon	1088	Morgan	West Virginia	1	0	0	0	0	0	0	
8	Polygon	1097	Mineral	West Virginia	0	0	0	0	0	1	1	
9	Polygon	1099	Marion	West Virginia	0	0	0	0	0	1	8	
10	Polygon	1104	Berkeley	West Virginia	1	0	0	0	0	0	2	
11	Polygon	1109	Tyler	West Virginia	0	0	0	0	0	0	8	
12	Polygon	1133	Hampshire	West Virginia	0	0	0	0	0	1	0	
13	Polygon	1143	Jefferson	West Virginia	0	0	0	0	0	0	1	
14	Polygon	1145	Pleasants	West Virginia	0	0	0	0	0	0	17	
15	Polygon	1148	Harrison	West Virginia	2	1	0	0	8	3	60	
16	Polygon	1150	Doddridge	West Virginia	0	0	0	0	0	1	0	
17	Polygon	1151	Taylor	West Virginia	0	0	0	0	12	0	2	
18	Polygon	1156	Wood	West Virginia	2	0	0	0	0	29	352	
19	Polygon	1159	Ritchie	West Virginia	0	0	0	0	0	1	22	
20	Polygon	1176	Grant	West Virginia	0	0	0	0	0	0	1	
21	Polygon	1185	Barbour	West Virginia	0	0	0	0	188	0	3	
22	Polygon	1188	Tucker	West Virginia	0	0	0	0	3	0	2	
23	Polygon	1197	Hardy	West Virginia	0	0	0	0	0	0	1	
24	Polygon	1216	Wet	West Virginia	0	0	0	0	0	2	27	
25	Polygon	1218	Lewis	West Virginia	1	0	0	5	0	1	53	
26	Polygon	1233	Randolph	West Virginia	0	0	0	0	19	1	24	
27	Polygon	1235	Upshur	West Virginia	0	0	0	4	8	2	43	
28	Polygon	1236	Gilmer	West Virginia	4	0	0	29	0	2	71	
29	Polygon	1239	Jackson	West Virginia	0	0	0	0	0	32	1398	
30	Polygon	1250	Calhoun	West Virginia	0	0	0	3	0	3	172	
31	Polygon	1258	Mason	West Virginia	1	0	1	1	0	333	154	
32	Polygon	1268	Pendleton	West Virginia	1	0	0	0	0	0	1	
33	Polygon	1270	Rosane	West Virginia	1	0	1	1	0	12	770	
34	Polygon	1284	Braidon	West Virginia	10	0	0	316	0	3	307	
35	Polygon	1316	Webster	West Virginia	24	0	0	16	0	4	225	
36	Polygon	1321	Pocahontas	West Virginia	8	2	0	0	0	0	73	
37	Polygon	1344	Putnam	West Virginia	1	0	0	0	0	443	2174	15
38	Polygon	1347	Clay	West Virginia	2	0	1	65	0	4	959	
39	Polygon	1349	Kanawha	West Virginia	22	4	2	2	0	162	18473	2
40	Polygon	1359	Cabell	West Virginia	2	2	0	0	0	6278	233	2
41	Polygon	1366	Nicholas	West Virginia	87	0	0	20	0	13	838	

Results

- 62 Individual Hospital Maps
 - Hospital Location
 - Total Discharges By County
 - Met 25%, 10% or both 25%/10% classification



Broadus Hospital



Total Discharges: 239

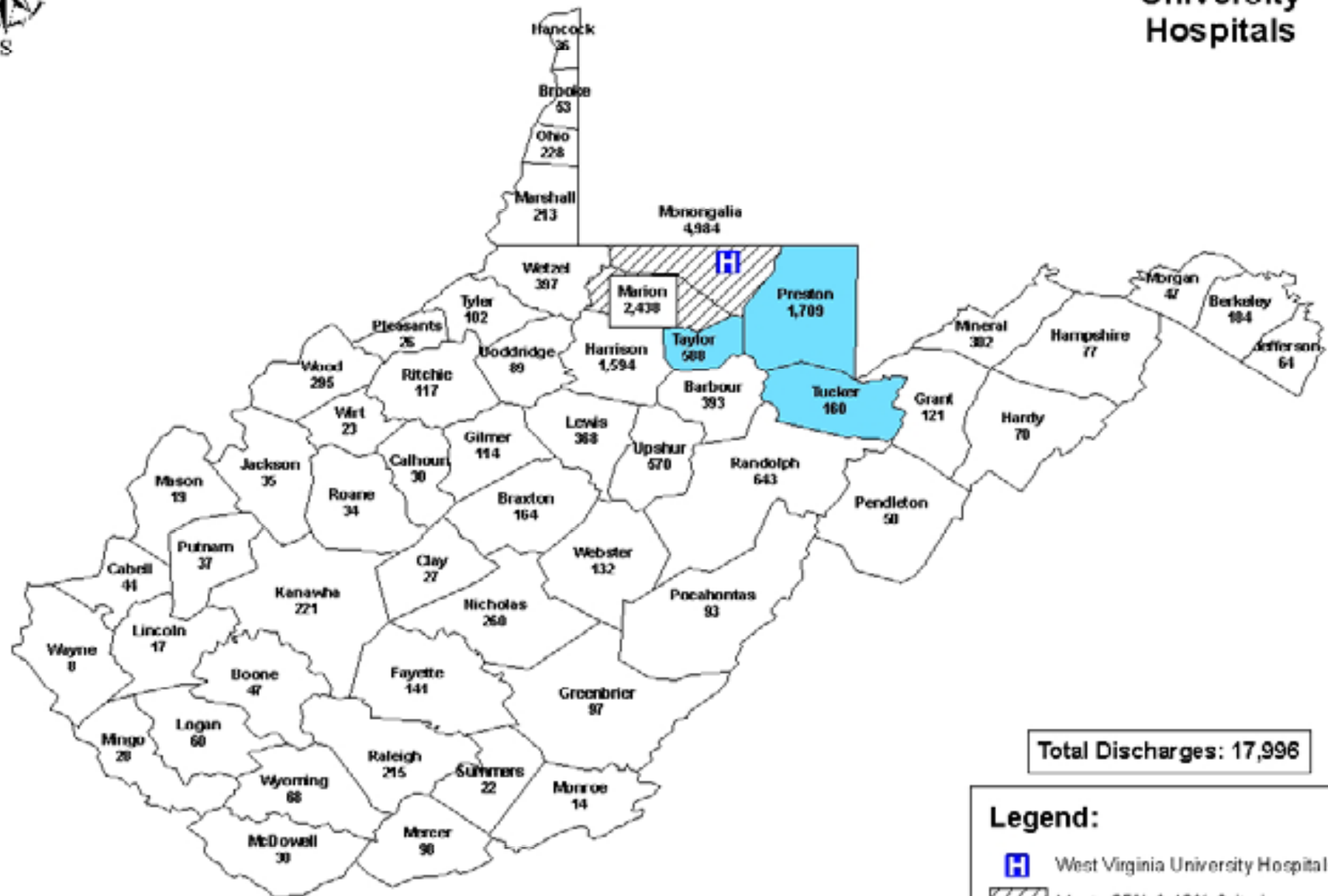
Legend:

-  Broadus Hospital
-  Meets 10% Criteria

Data Source: WV Health Care Authority Hospital Discharges, 2006.
Map Updated By Jennings Starcher, March 25, 2008.






West Virginia University Hospitals



Total Discharges: 17,996

Legend:

-  West Virginia University Hospitals
-  Meets 25% & 10% Criteria
-  Meets 25% Criteria

Data Source: WV Health Care Authority Hospital Discharges, 2006.
Map Updated By Jennings Starcher, March 27, 2008.

Conclusion

- Shows visual representation of which counties a hospital can count as its service area.
- Serves as a guide for when hospitals submit an application to CON division.
- Useful for policy-decision makers at HCA.

Future Goals

- Work with CON on developing maps that show discharges for hospitals by zip codes.
- Work on creating a web-based server that will display all maps.
- More partnerships with other divisions within agency when it comes to GIS.

Presenter Information

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Questions

