

Basic Health Screening Compliance Rates and Health Services Utilization  
Location Trends for Elderly Rural Residents of Vermillion County, Indiana:  
A Preliminary Survey to the Jury B. Loving, M.D. Rural Outreach Project

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## Introduction

The disparities in health services provision between rural and urban populations are a well-studied paradigm and one that especially affects the rural elderly [11, 23]. Over the last 20 years a multitude of studies have supported the fact that practically all aspects of urban health delivery and maintenance are superior, at least to some extent, to their rural counterparts [20]. Casey, Call, & Klinger state that when “controlling for demographic characteristics, health insurance status, and health system characteristics, rural non-adjacent residents are significantly less likely than urban residents to have a routine medical checkup, blood pressure screening, cholesterol test, mammogram, Pap test, fecal occult blood test, proctoscopy, or sigmoidoscopy”, and finally conclude that “the results indicate that rural residents are less likely than urban residents to obtain certain preventive health services and are further behind in meeting the Healthy People 2010 National Health Promotion and Disease Prevention objectives” [5].

As with any complex problem, the factors involved in these disparities seem to be multifactorial; more times than not, rural elderly populations occupy lower economic strata, enjoy less educational advancement, possess higher proportions of the uninsured, and face greater logistical challenges in the procurement of medical care than counterpart urban populations. The literature further reflects several similar barriers to obtaining preventive healthcare services among the rural elderly, including out-of-pocket cost of preventative services, travel distance to providers, transportation problems, and lack of recommendations regarding the need for the preventive service from a healthcare providers [5, 7, 8, 16, 19, 21, 24]. These barriers, combined with the health impacts associated with aging, and the aforementioned lack of health screening and education, make the rural elderly particularly vulnerable to poor health outcomes [10]. Interestingly, this is not a problem entirely unique to the United States, as White, Wang, & Jelinek report, “In Spain, a significant difference has been reported between rural and urban patients, with rural patients demonstrating a lower level of awareness. Control of hypertension also appears to be poorer in rural compared to urban areas. Several explanations have been proposed for this, including a lack of or poor implementation of guidelines such as those provided by the National Heart Foundation and poor patient compliance with treatment regimes” [25].

Having lived much of my life in rural Vermillion County Indiana, both through my own experience and that of family members and friends, I’m familiar with the challenges faced by the

rural elderly. These obstacles became wholly apparent along my mother's 15-year journey in the treatment of breast cancer. Throughout the course of any given week of the last four years of her life, she and my father, her primary caregiver, would travel between 250 and 700 miles per week in provision of her medical care. Most weeks were booked solid with physician's appointments, many in different cities, filling much of every day of the workweek. I saw firsthand the toll this took on an already weakened human being, not to mention the emotionally and physically exhaustive affect it had on my father. It occurred to me at that time that there should be some type of coordinative effort by medical professionals and allied health services to facilitate minimal demands on the most literally vulnerable members of our society.

It was through this observation that the Jury B. Loving, M.D. Rural Outreach was originally conceptualized. This project intends to utilize rural church services and senior community center gatherings for the provision of basic health screening services, minor procedures such as routine blood draws, and health maintenance education provision, to elderly rural attendees to whom the conditions of normal travel to healthcare appointments present hardship and/or grave inconvenience. Interestingly, as reported by Arcury, Quandt, & Bell, the rural elderly in other rural areas of the nation report positive experiences in receiving health maintenance services in churches, senior citizen centers, and community sites [2]. As in other places, the rural elderly of Vermillion County, Indiana often have difficulty driving as a result of lost vision, mobility impairments, and/or the ability to afford and maintain an automobile [3]. As part of the proposed project, medical and allied health services are intended to be provided by county, city, and private paramedicine services, volunteer licensed healthcare professionals from the target communities, and coordinating medical students from Indiana University School of Medicine's Rural Medicine Program. Alternative means of delivery of not just medical and nursing care is also a documented need; Ammerman, Keyserling, Atwood, Hosking, Zayed, & Krasny illustrate a marked need for nutritional services and counseling in rural communities [1]. A brief review reveals several instances in the literature that support the success of this model, especially with regard to the utilization of paramedic services in expanded community health roles [4, 13, 15]. Medical oversight would be provided by an offsite but on call physician who will also hold the position of project medical officer. Provision of these services will take place at various rotating predetermined sites in rural Vigo, Parke, and Vermillion Counties in west central Indiana.

It is hoped that this project can eventually evolve into a sustainable, grant funded, community based health initiative that includes expanded provision of health services, incorporating health maintenance education classes and home visits and checks for identified at risk individual participants in the program by paramedic provider participants in the outreach.

Through implementation of this model of community health in Vermillion County, it is hoped that not only primary preventive screenings and minor procedures can be delivered, but also health maintenance education. A marked deficit in health maintenance education among the rural elderly seems to be the one unifying thread throughout all of the literature reviewed, regardless of research location and specific demographic. The fact that many older rural patients seek medical care only when they perceive that they are sick [2], commonly do not place priority on screening and prevention [18], and are many times unfamiliar with the chronic care model of medical practice and an enhanced need for health maintenance screening [12], all present opportunities for corrective action that this proposal facilitates in providing an expanded scope of patient education by volunteer community health professionals with no added inconvenience to the target population. Furthermore, with consideration to medical student and guest physician participation, opportunities to address an in-place audience of the rural elderly with regard to screening and prevention can be expected to enhance patient compliance with regard to these medical paradigms, as documented by Mandel with the assertion that “physician recommendations demonstrate the strongest association with rural elderly participation in preventative practices” [6]. The original proposal for this program can be found in the appendix.

Upon consideration of the implementation of this project, it seemed prudent to first conduct a small pilot study of compliance rates among the rural elderly of Vermillion County utilizing a set of basic screenings appropriate to those members of the population as recommended by the United States Preventative Services Task Force (USPSTF).

## **Methodology**

The data gathered for presentation in this document was compiled in April 2013 through questionnaires (included in the appendix) distributed at three rural church evening bible studies in Vermillion County, Indiana. Vermillion County is located on the Illinois border in the south central aspect of the state with a total population of 16,040. 17.3% of this population is age 65 or older. The ethnic distribution of Vermillion County is 98.39% White, 0.26% Black or African

American, 0.24% Native American, 0.12% Asian, 0.02% Pacific Islander, 0.16% from other races, and 0.80% from two or more races. 0.64% of the population is Hispanic or Latino of any race. Vermillion County median household income is \$43,856 with 13.6% of the County population living below the poverty level.

Twenty questionnaires were distributed and collected by the author from attendee volunteers of the above-mentioned church functions. Sixty Percent of the respondents were male while forty percent were female. All respondents were at least sixty-five years of age, with the mean age being seventy-two. All respondents were Caucasian, and fifty percent were married couples.

## Results

This investigation considered seven areas of health maintenance and screening for evaluation: physical examination, blood glucose level, serum lipid panel, blood pressure, colonoscopy, osteoporosis screening (female respondents), and abdominal aortic aneurysm screening (male respondents). A mean of the seven measures yielded a result of 71.2% compliance based on USPSTF recommendations.

**Table 1.**

*Percentages of Compliance for Screening/Health Maintenance Exams*

	<b>Compliant by USPSTF standards</b>	<b>Sub-Compliant (not within USPSTF time frame, ex. yearly, every 5 years), or Noncompliant</b>
<b>Physical exam</b>	15 (75%)	5(25%)
<b>Blood glucose level</b>	17(85%)	3(15%)
<b>Serum lipid levels</b>	14(70%)	6(30%)
<b>Blood pressure</b>	18(90%)	2(10%)
<b>Colonoscopy</b>	11(55%)	9(45%)*
<b>Osteoporosis screening (Female)</b>	6(75%)	2(25%)
<b>AAA screening</b>	4(50%)	4(50%)

<b>(Males with smoking history)</b>		
<b>Means</b>	<b>71.43%</b>	<b>28.57%</b>

\* This value represents total noncompliance, i.e. respondents having never had a colonoscopy.

The survey also sought to analyze respondent rationales for noncompliance. Four possible responses regarding this inquiry were offered: “didn’t want to”, “too expensive”, “too inconvenient to go in”, and “I didn’t know I should have one”. The two highest areas of noncompliance were discovered to be colonoscopy, with 10(50%) of the noncompliant respondents selecting “didn’t want to”, and 50% selecting the “I didn’t know I should have one” response, and abdominal aortic aneurysm ultrasound screening, with 100% of the noncompliant respondents selecting the “I didn’t know I should have one” response.

**Table 2.**

*Mean Respondent Rationales for Noncompliance*

<b>“Didn’t want to”</b>	24.0%
<b>“Too expensive”</b>	20.14%
<b>“Too inconvenient to go in”</b>	0%
<b>“I didn’t know I should have one”</b>	32.0%

Finally, the location at which the screening/health maintenance service was provided was investigated. Three possible responses were offered: “Family doctor’s office”, “hospital”, and “community center”. Results were found to correspond with the normally expected trends in rural health services delivery, as per review of the literature, and are reported below.

**Table 3.**

*Mean Locations at Which the Screening/Health Maintenance Service was Provided*

	<b>Family doctor’s office</b>	<b>Hospital</b>	<b>Community center</b>
<b>Physical</b>	18(100%)	0	0
<b>Blood glucose</b>	17(100%)	0	0

<b>Serum lipids</b>	10(71.4%)	0	4(28.6%)
<b>Blood pressure</b>	16(89%)	0	2(11%)
<b>Colonoscopy</b>	0	11(100%)	0
<b>Osteoporosis screening</b>	1(25%)	3(75%)	0
<b>AAA screening</b>	4(50%)	2(25%)	2(25%)
<b>Means</b>	<b>62.2%</b>	<b>28.6%</b>	<b>9.2%</b>

## Discussion

Upon review of the data assembled above, a few trends come to light for further discussion. First, nearly 30% of respondents polled describe themselves as noncompliant with regard to screening/health maintenance behaviors when compared to USPSTF recommendations. When this data is extrapolated per published demographic reports by age for Vermillion County onto the trends presented in this investigation, projections for noncompliance or sub-compliance in Vermillion County alone would be reported at 793 individuals, or nearly 5% of the total population of the county. As Hutchison, Hawes, & Williams reported, the rural elderly are more likely to be institutionalized as a result of local deficits in service and support resources [9], and furthermore, according to Nelson, & Gingrich, are also more likely to suffer from multiple chronic conditions, primarily as a result of less than recommended levels of engagement in preventative care [14]. Although impossible to precisely predict within the current dataset, the economic and health delivery resources burden to local infrastructure, (even if only considered at 50% of nationally estimated means) represented by this sector of the population is inarguably and disproportionately astronomical.

Secondarily, nearly one third of respondents polled in this investigation reported lack of health literacy education as the primary contributor to their noncompliance. Several federal programs of late, such as one pilot program by the Veterans Administration, which utilizes web based educational services for expanded rural health education among veterans [22], are currently being explored. These facts aside, no community based health educational services are regularly offered in Vermillion County, as is also the case in many other primarily rural counties throughout Indiana. Through implementation of programs such as the one proposed, not only is an organized effort towards community-based elder health maintenance and screening initiated,

but through projected involvement of community-based health providers, a positive and real upturn in participant compliance should be expected [6].

Finally, two thirds of the respondents reported that they received the majority of their health maintenance/screening services through their family physician's office. Rosenblatt et al. reports that the rural elderly make less visits to physicians than their urban counterparts, but conversely, when they do, they see family practitioners much more often than specialists [17]. Although this study did not attempt to investigate overall health services utilization rates, its results certainly support the assertion that family practice physicians are responsible for the lion's share of health maintenance and screening provision among this survey's respondents. It should be noted that although the questionnaire did not specifically address family practice versus specialists services provision, the only specialist offices that exist in Vermillion County are hospital-based, and would have fallen under this category as was reported at a utilization rate of 28.6%, nearly half that of family practice providers.

## **Limitations**

The most obvious limitation is that regarding the study's sample size of 20 respondents; unfortunately, temporal and logistical limitations dictated this variable. Ideal sample size for such an investigation would have approached 100 respondents; contrasting a respondent rate of 0.007% of the county target population, in the case of 20 questionnaires analyzed, versus 0.04% of total county target population through the analysis of 100 completed respondent surveys presents the contrast at this difference represents. Inarguably, had this respondent expansion been possible, the statistical power of the presented data would have been greatly enhanced. This fact aside, interestingly, the data presented here correlate closely to those reported throughout the whole of the review of literature, an observation that this author finds reassuring with regard to the validity of the reflected conclusions.

Another possible confounding factor inherent to this study involves the fact that half those surveyed were married couples. This calls to question the randomness of selection, as it stands to reason that husbands and wives provide some amount of influence regarding each other's health maintenance decisions. Consideration must be made that this paradigm presents the opportunity for the occurrence of a more binary pattern of behavior, an event potentially



skewing data analysis trends and having the overall effect of a further constricted responded pool.

Finally, two other related factors must be considered throughout the interpretation of this data. The first of which involves overall compliance rates among the various tests selected for measurement. Specifically, physical examination, blood pressure, serum lipid levels, and blood glucose levels are tests likely to be “bundled” by most health care providers and administered during one visit. In other words, the presence of positive compliance for any one of these tests increases the likelihood of positive compliance for all of the measures. Furthermore, with regard to provision location, traditionally, patients do not commonly go to the hospital for a blood pressure check, or conversely the family physician’s office for a DEXA scan (osteoporosis screening). These factors considered, especially community setting and the demographics of the respondent pool, the results regarding provision location may entail little real significance.

## **Future Study**

Although many other aspects of demographic and compliance related investigation remain, in this author’s opinion, the discoveries presented in this work are sufficient reinforcement to proceed with the originally proposed community-based health project. Upon implementation of this project, several subsequent analyses will become appropriate and necessary. For example, later analysis of health maintenance and screening compliance rates among participants in the Jury B. Loving Rural Outreach would be of considerable value. Epidemiological documentation would also be of particular interest to various health researchers, county, and state health officials, while documentation of the number and nature of non-previously diagnosed pathologies would be paramount in establishing the utility and effectiveness of the program as a whole. Finally, as community paramedicine is able to become completely integrated in the provision of the proposed services, hospital readmission rates and emergency department visits among participants in the program could result in data collection with the potential for large-scale research and publication.

As our national health care system continues to change and evolve, regardless of specifics, alternative measures for provision of healthcare preventative and maintenance services must remain a fluid and dynamic ideal. Although indisputably integral to the continued profitability of national healthcare infrastructure, creative innovations intended to both lower

costs and improve outcomes for rural populations may represent not only better medicine, but the cornerstone of survivability among rural medical institutions and healthcare providers.

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## Appendix

### **Proposal: The Jury B. Loving Rural Senior Outreach**

This project utilizes rural church services and senior community center gatherings for the provision of basic health screening services and health maintenance education to elderly rural attendees to whom the conditions of normal travel to healthcare appointment presents hardship, by county, city, and private para-medicine services, volunteer licensed healthcare professionals from the target communities, and coordinating medical student(s) at various rotating predetermined sites in rural Vigo/Parke/Vermillion, Indiana counties.

#### **Location of Project:**

#### **1. Brief description of area/population where project will be conducted (population, socioeconomic status of population, etc.):**

Area: Vigo/Vermillion counties.

Population: rural elderly residents of the above mentioned counties.

Socioeconomic status of population: varied.

#### **2. Physician, clinic or hospital involved:**

No direct physician, clinic, or hospital involvement.

#### **3. Short term and long-term objectives of project:**

##### **Short-term goal:**

The delivery of needed community based health screening and maintenance to rural, elderly, and in need individuals who are underserved or experience hardship secondary to the travel requirement of health care office visits, but do not meet the requirements for or have the resources to utilize home based provision of health services, and to measure the effectiveness of the provision of said basic health screenings and services among the target population with emphasis on both significant health discoveries, follow-up facilitation, and perception of program value and effectiveness among the target population.

**Longer-term goal:**

The implementation of sustainable, grant funded community based health screening with application of proposed model/ infrastructure including multi-professional health education institutional involvement resourcing all interested Vigo County health education institutions, while expanding the role of community para-medical services to include home visits and checks for identified at risk individual participants in the program. This expansion of scope will include continued monitoring of above mentioned areas of research interest with addition of the implementation of research design elements intended to detect change in local emergency dept. visits and hospital readmission event numbers with regard to the project target population.

**4. Description of project (include details of how you plan to execute or how you executed your project):**

The provision of basic health screenings (vital signs, medication reconciliation checks, blood sugars, serum cholesterol, basic routine lab draws, etc.) on site at various community rural locations including but not limited to evening church services, community senior centers, and other convenient locations already frequented by the target population. This program will be overseen by an offsite but on call Physician, facilitated and implemented by onsite medical student(s) whose responsibilities include performing, overseeing, and coordinating the previously mentioned screenings and services by community para-medicine providers, other volunteer allied health professionals, and eventually other health profession students as interest and availability develops. Emphasis on primary preventative care, basic health maintenance and information delivery, and the coordination of follow-up resources for needs discoveries would be emphasized.

**5. Target population:**

See above.

**6. Timeline for completion (include start and completion dates, as well as dates for administering research tools used such as surveys, questionnaires, etc.):**

This is designed to be a sustained project.

Target field implementation with administration of research tools slated for late 2014.

**7. How does this project meet level 3 Competency VI (or any other IUSM competencies)?:**

This project should conform to the standards set forth in the description:

*The Social and Community Contexts of Health Care*

*Level 3:*

*The Level 3 Medical Student will improve the care of groups of patients or the healthcare system by applying their understanding of the relationships between the individual, the community, and the healthcare system in the areas of environment, health policy and advocacy, law and oversight, economic impact, health literacy, culture, social influence, and spirituality.*

(<http://medicine.iu.edu/ume/curriculum/competencies/the-social-and-community-contexts-of-health-care/1/>)

**8. Tools used in project:**

See attached.

Documentation of vital statistics (age, medical home, number of patients seen, problem discoveries, etc.) with basic statistical analysis, completion of questionnaire centering on interrogatories regarding involvement in medical services, medical home, and patient perception of services provided by the project.

**9. Assistance needed:**

Medical oversight and coordinators mentioned above

Community para-medicine organizational involvement

Volunteer community healthcare professional involvement

**10. Potential obstacles to completing project:**

Time requirements needed to organize and implement pilot program, and coordination responsibilities between various healthcare provision services and volunteers

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**Standard Health Screening Questionnaire**

Age: \_\_\_\_\_ Gender: M F

**1. Physical****How long since last physical?**

- Last year
- More than two years ago
- I don't remember when

**If not had a physical in the last year, what was the reason?**

- Didn't want to
- Too expensive
- Too inconvenient to go in
- I didn't know I should have one

**If had a physical in the last year, where was it done?**

- Family doctor's office
- Hospital
- Community center

**2. Blood Sugar Test****How long since last Blood Sugar Test?**

- Last year
- More than two years ago
- I don't remember when
- Never

**If not had a Blood Sugar Test in the last year, what was the reason?**

- Didn't want to
- Too expensive
- Too inconvenient to go in
- I didn't know I should have one

**If had a Blood Sugar Test in the last year, where was it done?**

- Family doctor's office
- Hospital
- Community center



### 3. Cholesterol Test

**How long since last Cholesterol Test?**

- Within last five years
- More than five years ago
- I don't remember when
- Never

**If not had a Cholesterol Test in the last five years, what was the reason?**

- Didn't want to
- Too expensive
- Too inconvenient to go in
- I didn't know I should have one

**If had a Cholesterol Test in the last five years, where was it done?**

- Family doctor's office
- Hospital
- Community center

### 4. Blood Pressure Test

**How long since last Blood Pressure Test?**

- Last year
- More a year ago
- I don't remember when
- Never

**If not had a Blood Pressure Test in the last year, what was the reason?**

- Didn't want to
- Too expensive
- Too inconvenient to go in
- I didn't know I should have one

**If had a Blood Pressure Test in the last year, where was it done?**

- Family doctor's office
- Hospital
- Community center

**For Ladies:**

### 5. Osteoporosis Screening

**Have you had an Osteoporosis Screening?**

Yes            No

**If not, what was the reason?**

- Didn't want to
- Too expensive
- Too inconvenient to go in
- I didn't know I should have one

**If so, where was it done?**

- Family doctor's office
- Hospital
- Community center

**6. For Gentlemen:  
Abdominal Aortic Aneurism**

**Have you ever smoked cigarettes, cigars, or a pipe?**

**Yes            No**

**Have you had an Abdominal Aortic Aneurism screening (ultrasound)?**

**Yes            No**

**If not, what was the reason?**

- Didn't want to
- Too expensive
- Too inconvenient to go in
- I didn't know I should have one

**If so, where was it done?**

- Family doctor's office
- Hospital
- Community center

**7. Colonoscopy**

**How long since last Colonoscopy?**

- In last five years
- More than ten years ago
- I don't remember when
- Never

**If not had a Colonoscopy, what was the reason?**

- Didn't want to
- Too expensive
- Too inconvenient to go in
- I didn't know I should have one

**If had a Colonoscopy, where was it done?**

- Family doctor's office
- Hospital
- Community center