

appalachian rural health institute

**ARHI**



**Diabetes Prevalence, Risk and Needs Assessment  
Study Area 1: Athens, Hocking, Pike  
and Vinton Counties**

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## **Diabetes Prevalence, Risk and Needs Assessment Study Area 1: Athens, Hocking, Pike and Vinton Counties**

The first Community Needs Assessment for the Appalachian Rural Health Research Institute (ARHI) focused on assessing prevalence, risk factors and access to resources for chronic health conditions in four Ohio Appalachian counties: Athens, Hocking, Pike and Vinton. ARHI placed the initial emphasis for the needs assessments and companion research and service development components upon diabetes mellitus. In particular, the needs assessment wanted to discover:

1. The current prevalence of known diabetes within the adult population.
2. The prevalence of certain risk factors for the development of diabetes in the future.
3. Resources available to prevent, treat and help diabetic persons manage diabetes.
4. Health literacy levels and cultural acceptability issues of relevance to diabetic populations in the study area.

This baseline information will support development or revision of health education, prevention, screening, referral and treatment programs and services within the four counties. Persons receiving the benefit of these revised or additional services will also be invited to participate in clinical and basic research designed to seek better ways to manage diabetes.

Conduct of the needs assessment was comprised of five components:

1. Review and analysis of available estimates based on state, national and local surveys and vital statistics data.
2. Conduct of a household telephone survey to assess prevalence of diabetes and selected risk factors among adults.
3. Compilation of information about available health care resources to support patients in managing their diabetes.
4. Conduct of interviews of primary care providers to ascertain needs for and interest in continuing education, consultation support and allied health team supports for management of diabetic patients.
5. Conduct of in-depth interviews, focus groups and surveys to define qualitatively the barriers and other concerns relating to effective patient education, compliance and health literacy.

The first three components were conducted by Ohio University's Institute for Local Government Administration and Rural Development (ILGARD). ILGARD shared responsibility with the ARHI Director for the fourth component. With design input from ILGARD and other ARHI partners, the College of Health and Human Services' School of Nursing was responsible for component five .

The telephone survey and in-depth interviews about patient education, compliance and health literacy are each presented in separate reports by the primary researchers. This report includes summary information on the review of existing data and research, telephone survey, provider interviews, and inventory of available resources.

## **Available Data and Previous Research**

### **National and State Prevalence Data**

Prevalence, incidence and mortality rates of diabetes are of growing concern at national, state and local levels. As of the turn of the century, diabetes ranks as the sixth leading cause of death listed on death certificates. Over 69,000 death certificates listed diabetes as the cause of death (nearly twice the number reported in 1980), while many more referenced diabetes as an underlying cause of death. In total, diabetes contributed to 213,062 deaths among U.S. residents in 2000. The 2000 age-adjusted death rate from diabetes was 25.2 per 100,000 population.<sup>1</sup>

Within the adult population aged 45-64, all of the leading causes of death in 1950 have shown marked declines in deaths except for diabetes. After a moderate decline between 1970 and 1985, diabetes death rates in this age group (22.8 per 100,000) have now returned to levels near the 1950 level (24.1 per 100,000).<sup>2</sup>

Diabetes is also mentioned as contributing to deaths attributed to other causes such as heart disease, stroke and kidney disease. In 2000, diabetes contributed to twice as many deaths in persons age 45 and older than deaths directly caused by diabetes. According to the Centers for Disease Control, as many as 65% of deaths among diabetics may not have diabetes indicated on the death certificate at all and only 10-15% certificates of deceased diabetics list diabetes as contributing to the cause of death. Consequently, the actual mortality rates directly and indirectly caused by diabetes are likely to be much higher.<sup>3</sup>

Ohio death rates from diabetes are notably higher than the national averages and have been climbing in recent years. The average age-adjusted mortality rate for the three year period of 1999-2001 was 33.0 per 100,000 residents – up from 29.6 in 1993-1995.<sup>4</sup> Seventeen hundred more Ohio resident deaths are directly caused by diabetes each year than twenty years ago.

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<sup>1</sup> National Vital Statistics Report, Vol. 50, No. 16, September 16, 2002.

<sup>2</sup> Centers for Disease Control and Prevention, “Chartbook on Trends in the Health of Americans”, **Health United States**, 2003.

<sup>3</sup> Centers for Disease Control and Prevention, National Diabetes Fact Sheet. Atlanta, GA: U.S. Department of Health and Human Services, 2003

<sup>4</sup> Ohio Department of Health, Vital Statistics, August 15, 2003.

Not only does diabetes contribute to deaths, but the impact is felt in increasing disability and utilization of health care resources. Nearly 28% of persons age 55 and over with diabetes report limitation in activity caused by their disease. Diabetic populations are using health care services at increasing rates. In 1999-2000, persons aged 65 and older averaged 567.9 ambulatory care visits per 1,000 diabetics – an increase of 131.6 visits per 1,000 diabetics since 1995-1996.<sup>5</sup> Some of this increase in utilization may be attributable to increased physician knowledge and options in helping diabetics manage their condition. However, hospitalizations among persons with diabetes also continue to increase. Since 1990, the average number of hospitalizations per 10,000 diabetics age 45 and over increased from 319.1 to 410.4.<sup>6</sup>

The Centers for Disease Control and Prevention coordinates the Behavioral Risk Factor Surveillance System through which each state health authority conducts household surveys. This is the most comprehensive source of state and national estimates of the actual prevalence of diabetes. As of 2002, the BRFSS reported a national median prevalence rate of 6.7% of adult residents and an Ohio rate of 7.7%.<sup>7</sup>

### **Existing Local Prevalence Data**

Local assessments conducted in the region have indicated relatively high rates of diabetes. A series of over 1,000 interviews and surveys conducted at local gatherings (farmers' markets, county fairs, etc.) in 1998 found 16% of adults having been diagnosed with diabetes in Athens and some surrounding communities.<sup>8</sup> Similarly, 23.6% of 1,500 adults in Athens County responding to a county health department survey indicated that diabetes affected their household.<sup>9</sup> All of these findings appear to indicate a high prevalence of diabetes in the project area. However, each assessment had weak methodologies.

Diabetes prevalence rates generated by the BRFSS and the Athens County data represent only those persons who have been diagnosed with the disease. Countless local screening programs continue to identify previously undiagnosed persons. For example, of 120 adults screened in one of the project area

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<sup>5</sup> Centers for Disease Control and Prevention, National Center for Health Statistics: **National Ambulatory Medical Care Survey** and **National Hospital Ambulatory Medical Care Survey**. 1995-96 and 1999-2000.

<sup>6</sup> Centers for Disease Control and Prevention, National Center for Health Statistics, **National Hospital Discharge Survey**, 1990-91 through 2000-01.

<sup>7</sup> National Center for Chronic Disease Prevention and Health Promotion, Behavioral Risk Factor Surveillance System. [www.cdc.gov/brfss](http://www.cdc.gov/brfss).

<sup>8</sup> Unpublished research conducted by A. Pheley, PhD, Ohio University College of Osteopathic Medicine, 1998.

<sup>9</sup> Unpublished results of survey conducted by Erin Mansour, MA, Athens City-County Health District, 1999. The specific question was "Please check up to 3 health conditions that affect your household the most."

counties in 2001-2002 (Pike County), 15 had abnormally high glucose readings and had not previously been diagnosed with diabetes.<sup>10</sup>

After the close of the referenced Pike County project, a local chapter of the Central Ohio Diabetes Association continued conducting screenings throughout the county for over a year (July 2002-November 2003). In total, 687 additional adults received blood glucose screenings in a variety of community locations, including civic clubs, places of employment, retail businesses, public libraries, a pharmacy and a flea market.

The Pike community screenings yielded 109 (16%) abnormal readings, half of whom (55) had no previous diagnosis of diabetes. The 55 abnormal readings represented 9.5% of the entire 581 persons screened with no prior diagnosis of diabetes. Of the persons screened, one-quarter (24.9%) did not report having a personal physician. Of those individuals with no personal physician, 21 blood tests (12.3%) indicated abnormal glucose levels.

All of the community screening results are from self-selected and opportunistic samples. The screening episodes occurred in a variety of community locations, but were strictly voluntary. Only those persons willing to be screened were tested. This sampling methodology has an unknown effect on how well the results indicate true prevalence in the community.

## **Risk Factors**

The local screening efforts give some indication of the potential for hidden diabetes within the project area population. Other indications come from measures of known risk factors. Key risk factors for diabetes continue to rise. Three risk factors are of particular interest:

- Overweight and obesity
- High weight births
- Low weight births

**Overweight and obesity:** Persons who are overweight, especially those who are obese, are at significantly higher risk for developing many chronic health problems, including Type 2 Diabetes. A common measure of overweight and obesity is the Body Mass Index (BMI). The BMI is calculated by dividing a person's body weight in pounds by the square of his or her height in inches, then multiplying the result by 703. The BMI is more highly correlated with body fat than any other indicator of height and weight.

Individuals with a BMI of 25 to 29.9 are considered overweight. However, some athletes who deliberately build higher than average muscle mass may post a similar BMI but not have a lot of body fat.

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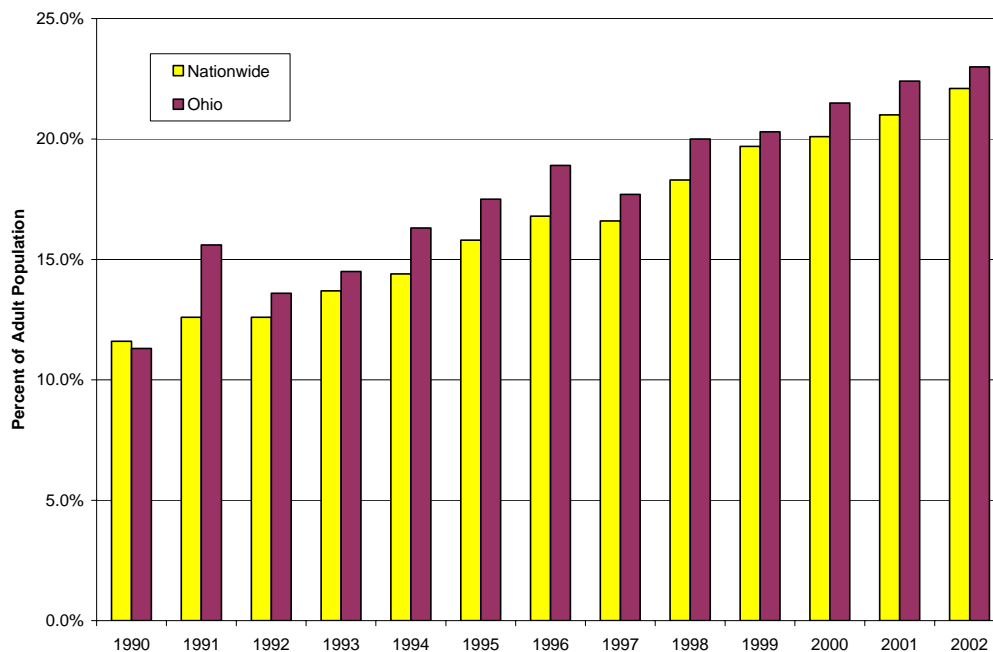
<sup>10</sup> The criteria used to define a high glucose reading were >120 for a fasting test and >140 for non-fasting.

Individuals with a BMI of 30 or more are considered obese and do have excess body fat. According to the **NIH Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults**, all adults (aged 18 years or older) who have a BMI of 25 or more are considered at risk for premature death and disability as a consequence of overweight and obesity. These health risks increase even more as the severity of an individual's obesity increases.

Obesity in particular has been increasing at a rapid rate over recent decades. Since 1990, obesity among U.S. adults has risen from less than 12% to 22.1%<sup>11</sup>. The highest rates are among adults aged 50-59 and 60-69 (26.1% and 25.3%, respectively in 2001). (See Figure 1.) In recent years, Ohio has ranked between 15 and 20 among states in percent of obesity among adults. In 2002, 23% of Ohio adults were reported to be obese by BMI calculations.

**Figure 1**

**Trends in Rates of Obesity among Adults:  
1990-2002**



Of equal concern has been the alarming rise of overweight among children. In the 1960s, 4% of children age 6-11 and 5% of adolescents (age 12-19) were overweight in the nation. By 2000, those rates had risen to 15% for both age groups.<sup>12</sup>

<sup>11</sup> CDC Behavior Risk Factor Surveillance System (BRFSS)

<sup>12</sup> Ibid.

**High Weight Births:** Women who deliver babies weighing over 9 pounds at birth are at increased risk for developing Type 2 diabetes later in life.<sup>13</sup> Nearly 380,000 (9.4%<sup>14</sup>) 2001 births in the U.S were overweight babies, leaving their mothers at risk for diabetes.

Since 1990, there have been 202,403 births of high weight babies in Ohio<sup>15</sup>. Although some women may have birthed more than one overweight baby during that time period, there are still close to 200,000 Ohio women with this elevated risk factor for diabetes.

Within the four-county AHRI study area, there have been over 2,000 births weighing more than nine pounds between 1990 and 2001. All of these mothers are at risk for developing Type 2 diabetes.<sup>16</sup>

**Low Weight Births:** Although risk applies to mothers of high weight babies, low weight babies, themselves, are at increased risk of developing diabetes during their lifetimes.<sup>17</sup> After a decline in the 1980s, the percent of total live births that are below 2,500 grams has been increasing in the nation and in Ohio over the past ten years. In 2002, 7.8% of all U.S. births were low weight – the highest proportion since 1970<sup>18</sup>. Consistently over the past decade, Ohio has posted rates of low weight births that are slightly higher than national rates.

Average rates within the study area tend to follow state and national trends. Overall, within the past twenty years (1982-2001), 2,153 babies have been born to study area residents that are at increased risk for developing Type 2 diabetes<sup>19</sup>.

## Childhood Prevalence and Risk

Good data on childhood diabetes prevalence and risk are rare at state and national levels, and non-existent at the local level. At ARHI's request, the Health Leadership Team from the public education systems in Athens County undertook an internal enumeration of known diabetic children. The effort drew data from five school districts, the joint vocational school, school for children with developmental disabilities, preschool, Head Start and Birth-to-3 (Help Me Grow). Of the 9,500 children included in

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<sup>13</sup> Herman, WH, Smith, PJ, Thompson, TJ, Engelgau, MM, and Aubert, RE. *A new and simple questionnaire to identify people at increased risk for undiagnosed diabetes*. **Diabetes Care**, Vol. 18, Issue 3 382-387.

<sup>14</sup> Centers for Disease Control, **National Vital Statistics Reports**, Vol. 51, No. 2, December 18, 2002.

<sup>15</sup> Ohio Data Warehouse, Ohio Department of Health, [www.dwhouse.odh.ohio.gov/](http://www.dwhouse.odh.ohio.gov/).

<sup>16</sup> Ibid.

<sup>17</sup> Rich-Edwards, J.W. et al. "Birthweight and the Risk for Type 2 Diabetes Mellitus in Adult Women", **Annals of Internal Medicine**. 1990; 130:278-284.

<sup>18</sup> **Health United States, 2001**. Centers for Disease Control and Prevention, National Center for Health Statistics, 2001, p. 142; **Data 2010: Healthy People 2010 Database**, January 1004 Edition, [www.wonder.cdc.gov/](http://www.wonder.cdc.gov/); and **U.S. Birth Rate Reaches Record Low**, National Center for Health Statistics 2003 News Release, [www.cdc.gov/nchs/releases/03news/lowbirth.htm](http://www.cdc.gov/nchs/releases/03news/lowbirth.htm).

<sup>19</sup> Ohio Data Warehouse, Ohio Department of Health, [www.dwhouse.odh.ohio.gov/](http://www.dwhouse.odh.ohio.gov/).

these programs, 22 (0.23%) were known to be diabetic. In general, these children were identified because they were insulin dependent or needed medication support from school personnel. As was seen in the ARHI household telephone survey summarized below, a number of parents reported that their diabetic children were not currently taking medications or insulin.

One of the Athens County school districts undertook a risk assessment of kindergarten and early elementary students. For each of grades K through 4, well over one-third of students were measured with Body Mass Indexes at or above the 85<sup>th</sup> percentile for gender and age.

### **Issues in Assessing Risk and Prevalence**

The foregoing data provides only limited indications of the scope of the threat diabetes presents to residents of Southeastern Ohio. Despite growing concerns within the public and private health sectors, reliable data is not available about the true prevalence of diabetes or the leading risk factors – overweight and obesity. As noted above, even mortality data from diabetes is unreliable as many deaths of diabetics are attributed to the immediate cause rather than the underlying cause. Consequently, the ARHI research team undertook direct gathering of local data on prevalence of diabetes and risk factors for chronic diseases, including diabetes.

### **Community Telephone Survey**

As part of the project area needs assessment, an assessment survey was conducted of residents in Athens, Hocking Pike and Vinton counties. The survey collected prevalence data for a variety of chronic diseases including diabetes, emphysema, and hypertension. Similar information was obtained for known chronic disease risk factors such as smoking, high cholesterol, and obesity. The survey was purposely modeled upon previously existing large-scale national and state surveys in order to allow for a comparative analysis of the results. A full copy of the survey instrument, detailed description of the methodology, and complete analysis has been published previously under a separate cover.<sup>20</sup>

Some critical points from the needs assessment survey specific to diabetes and related risk factors include:

- Survey findings for Athens County are heavily influenced by the unusually high percentage of the adult population aged 18 to 24 (37.6% compared to 10.9 to 12.2% for Hocking, Pike, and Vinton counties, and 15.5% in Ohio). When this age group is removed, Athens County prevalence rates are much closer to those of the remaining three counties and Ohio.

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<sup>20</sup> Institute for Local Government Administration and Rural Development, *Health Needs Assessment Survey: June 2004*, prepared for the Appalachian Rural Health Institute, Athens, Ohio, 2004.

- When compared to the results of benchmark studies conducted in Ohio, Appalachian Ohio, and nationally, the perceived health status of ARHI respondents is worse. Specifically:
  - Perceived health status is particularly poor for Vinton County residents.
  - As age increases, perceived health status deteriorates across all four counties.
- The ARHI diabetes prevalence rate (8.3% of population age 18 and over) is essentially the same as in the state of Ohio and the nation.
  - Diabetes rates are highest in Vinton and lowest in Athens counties.
  - Fifteen percent of adult diabetics are not receiving medical care for their conditions at this time, and 22% of diagnosed diabetics do not take medication for this illness.
  - Over half of the surveyed households with diabetic children say their child diabetics are not taking medication for this condition.
  - The older the ARHI county resident, the more likely he/she is to have diabetes.
  - As the income level decreases, the likelihood of having diabetes increases.
  - Diabetics are more likely to report their health status as being poor or fair than are non-diabetics.
  - Diabetics are more likely to be depressed than the general population.
  - As body mass increases, so does the likelihood of having diabetes.
- Proportionately fewer ARHI county residents know they have a cholesterol problem than residents in the United States as a whole.
  - Just 25% reported having high cholesterol compared to 35% nationally.
- Although the ARHI hypertension rate (22%) is similar to the national rate (21 percent), there is considerable variation within the ARHI counties, with Hocking having the highest rate (28%) and Athens the lowest (18%) rate.
- On a daily basis, a quarter of ARHI study area residents participate in moderate activities and 12% exercise vigorously.
- On a daily basis, 18% of the ARHI study area residents never participate in moderate activities and 31% never exercise vigorously.
- The percentage of ARHI county residents who qualify as obese, according to the Centers for Disease Control and Prevention (CDC) guidelines, is greater than the state or national rate.
  - As age increases, so does body mass.
  - As body mass increases, activity levels decrease.
  - Athens County, with its younger population, has lower rates of overweight and obesity than the remainder of ARHI region, Ohio or the nation.
  - Hocking and Vinton counties have the highest obesity and overweight rates in the study area.

Although the preceding highlights include only those findings with relevance to diabetes and related risk factors, the survey also found indicators of concern relating to asthma, stroke, heart disease, and emphysema.

- Asthma rates are somewhat higher across the four ARHI counties than in the nation.
- Strokes and mini-strokes affect 33% more persons in the study area than in the nation.
  - Hocking and Vinton counties contribute the most to this higher rate.
- The ARHI heart disease rate is 52% higher than the national rate.
  - All four counties have higher rates for this condition.
- Emphysema rates among ARHI residents are 81% higher than the national rate for this illness.
  - Vinton and Pike Counties contribute the most to this rate.

### **Primary Care Provider Interviews**

The project team planned to interview individually all primary care physicians within the study area. The purpose of the interview was to ascertain information in three areas:

1. Specialty and other services physicians needed to access for their patients,
2. Provider confidence in caring for diabetic patients and desire for information and/or continuing education, and
3. Approximate patient load of the physician of diabetic patients and patients at risk, divided by adults and children.

A copy of the interview questions is included in Appendix A.

The interviews were designed to be conducted by telephone in order to minimize demands on provider time. The ARHI Director -- a physician -- personally conducted the interviews in an attempt to improve the response rate. At the time of the interviews, there were 81 primary care physicians practicing in the four county project area. Nearly 60% of these physician practices were located in Athens County, although a large proportion of these are faculty at Ohio University and practice only part time.

**Figure 2**

**Primary Care Physicians by County: January, 2004**

	Athens*	Hocking	Pike	Vinton	ARHI
<b>Family Practice</b>	27	9	10	2	48
<b>General Practice</b>	0	4	0	0	4
<b>Pediatrics</b>	8	2	2	0	12
<b>Internal Medicine</b>	7	2	8	0	17
<b>Total Primary Care</b>	42	17	20	2	81

**Note.** \*A large proportion of the Athens County providers are also faculty at Ohio University. Consequently, many practices are parttime only.

The response rate to the interview effort was generally disappointing. The overall response rate was 35.8%, which is relatively high for physician surveys. However, the overwhelming majority (93.3%) of responses were from Athens County, where physicians are accustomed to working with the university on research projects. No Hocking County physicians agreed to be interviewed, and only one from each of Pike and Vinton County participated.

**Diabetes Services Needed:** Slightly less than half of the interviewees (46.7%) reported difficulties gaining specialty consults for their diabetic patients. At least half of the reports included Endocrinology (57.7%) and Nephrology (50.0%). Fewer physicians reported difficulties accessing vascular (28.6%) and vision care (14.3%) specialty care for diabetic patients.

Two-thirds of interviewed physicians reported patient needs for at least one non-physician service, with diabetic health education (36.7%), counseling (30%), nutrition/dietician services and transportation (both 26.7%) leading the list. In addition, 23.3% reported that diabetic patients needed social services.

Physicians were also asked about needed services to help prevent diabetes in their respective communities. Eighty percent of interviewees saw a need for more health education, and two-thirds wanted greater opportunities and motivation for weight loss programs. In particular, physicians reported needs for services in nutrition and exercise promotion.

**Physician Confidence:** Ninety percent of interviewed physicians believed that they currently had adequate information and education to competently care for their diabetic patients. However, 80% indicated an interest in receiving information about the activities and services of the university's diabetes team. One physician pointed out that there were inadequate resources to help physicians know how to appropriately and effectively manage chronic pain in their patients.

**Patients in Care:** All non-pediatric physicians interviewed cared for at least a few adult diabetic patients. These physicians averaged slightly over 50 diabetic patients, ranging from fewer than 5 to over 150.

The physicians interviewed collectively care for 40 diabetic children, with only 11 of these being seen by the four participating pediatricians. However, most physicians who cared for children reported significant levels of overweight and obesity. Five family practice physicians reported that at least half of their pediatric patients were overweight. Pediatricians estimated a range of 10% to 40% of patients overweight. Nearly half of the 21 physicians seeing children and responding to the question observed obesity in 10% to 20% of their pediatric patients.

### **Local Health Resource Inventory**

Diabetics within the project area have limited resources upon which to draw in helping to manage their condition. All four counties are designated as Health Professional Shortage Areas (HPSA) for primary care. Athens, Hocking and Pike counties are designated for their combined population of 32,900 low income residents. Vinton County is designated as having too few physicians for the entire resident population (12,600). According to current federal<sup>21</sup> calculations, the four counties need a total of four additional primary care physicians to remove the HRSA designation. However, this estimation is based on the HPSA threshold of 3,000 residents per primary care physician. If all residents had a personal physician and were receiving optimal primary and preventive care from a local provider, the professional standard for primary care would be 1,500 residents per primary care physician. Using this more “ideal” ratio, the area must recruit 20-22 additional physicians. Given the large student population in Athens with low needs for primary care, the true needs are somewhere between the HPSA calculation and the “ideal”.

The project team, with assistance from local project partners in all four counties, developed an inventory of health care professionals and support services available locally to diabetic residents. Such an inventory is a moving target, as providers and organizations appear and vanish with some regularity. Appendix B contains the current inventory for each of the counties. The ARHI team hopes to continually update and expand the listings for use by providers and other organizations that serve diabetics, their families and persons at risk for diabetes.

The presence of Ohio University and two cities with hospital-centered health care systems clearly contribute to the richer listing of resources in Athens County. Athens is the only local source of diabetes specialty care. However, two Federally Qualified Health Centers (FQHCs) in the study area participate in

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<sup>21</sup> HPSA designations are made by the Health Resources and Services Administration (HRSA) of the U.S. Department of Health and Human Services.

the HRSA Health Disparities Collaborative for diabetes. Family Health Centers of CAO-Pike County provides collaborative care in its three locations: Waverly, Piketon and Beaver. Family Healthcare, Inc, provides diabetes collaborative care in Vinton County and is expanding the program into the Hocking County location by early 2005. Although not listed in the inventory, internal medicine providers without endocrinology certification provide some services in nearby Ross County (adjacent to Pike and Vinton Counties).

Diabetic patient education and support group services are available in Hocking and Pike Counties. The educational, support and nutritional counseling services offered by the Hocking Valley Community Hospital are especially comprehensive. All four counties have some home health services, but sources of durable medical equipment and other needed retail items, such as orthopedic footwear, are rare.

In addition to the organized provider resources included in the listing, other supports and potential supports are present in the counties. School districts attempt to provide supervision and nutritional supports for children with diabetes. School nurses and nutrition programs are beginning to become proactive in encouraging healthier lifestyle choices. The OU-COM Community Services Program, a partner in ARHI, has a small grant to work with a few Athens area schools on obesity prevention.

The seriously limited resources available to the schools permit few significant initiatives. However, the school systems contacted during the needs assessment were interested in pursuing collaborative ventures with the ARHI team. The ARHI Director and endocrinologist have held an initial meeting with the Athens County School Health Leadership Team to explore potentials for collaboration in the future. The Health Leadership Team is comprised of teachers, guidance personnel and dieticians from five local school districts, pre-school programs and educational services for children with special needs.

Schools in Vinton and Hocking Counties also have school nurse programs which could be included in collaborative ventures.

### **Summary Discussion**

The incidence of diabetes is growing at an alarming rate nationally, statewide and in the ARHI project area. Although the ARHI research found diabetes prevalence levels similar to state and national rates, screening data indicates a sizeable presence of unrecognized, undiagnosed diabetes. If the survey reported known diabetes prevalence is extended to the entire adult population of the ARHI research area, there are approximately 8,400 diagnosed diabetics. If the Pike screening data is any indication, there may be a nearly equal number of undiagnosed diabetics today.

The existence of undiagnosed diabetes is joined by a major presence of risk factors to predict continued steep growth in diabetes and related complications. Obesity and health-threatening inactivity are very common within the area. Over 31% of adult residents are overweight and nearly 24% are obese. One school system found that over one-third of young school children were at or above the 85<sup>th</sup> percentile in weight for their age. Approximately 2,000 women who gave birth to high weight children between 1990 and 2001 are at increased risk for diabetes, as are the over 2,000 low weight babies born since 1982.

Given the growing numbers of diabetics and the huge population at risk of developing diabetes, resources for both treatment and prevention are crucial. The primary care shortage area designations for all four counties indicate a physician base that is extremely over-extended to meet all primary care needs. The resistance of local physicians to participate in collaborative efforts or research questions may be indicative of the overwhelming demands on their time and energy. It seems logical that such over-extension of resources would result in less than optimal care for diabetics, with their more complex medical needs. More creative ways must be found to provide acceptable and effective supports to these physicians as they seek to address the growing medical demands. This may evolve as consultative relationships with the ARHI Diabetes Specialist grow. ARHI is the only source for a diabetologist in the four-county area.

In addition to treatment, diabetics have greater needs for an array of ancillary and support services. Many communities in the area have inadequate access to such services as vision care, podiatry, dentistry, mental health, physical and occupational therapy, and hearing and speech services. Even when the professional services are present, they are rarely linked into a collaborative mode of care with the medical management of diabetes.

Specialized diabetic education to empower diabetics and their families to maintain an optimal level of health is scarce in the area. Hocking Valley Community Hospital provides the most comprehensive, community-wide diabetic education service in the area. The FQHCs in Pike and Vinton provide educational supports for their own patients, but patients of other providers have no such resources. Counseling on disease management, with special emphasis on dietary issues, is a major gap in the rest of the area. Not only are there too few nutritional counselors, but there are few mechanisms to link diabetics and families with these services.

Diabetic support groups also help individuals and families design self-management programs. These are also scarce in the region.

## **Conclusions**

- ✓ Diabetes is a large and rapidly growing problem in the region.
- ✓ An unknown but probably large number of adult residents have diabetes but do not know it yet.
- ✓ Half of area children known to have diabetes may not be receiving treatment.
- ✓ The majority of the general public is at risk of developing diabetes.
- ✓ There are not enough physicians, especially with current additional training in diabetic care, in the area to adequately treat the growing population of diabetics.
- ✓ There are gaps in ancillary and support services.
- ✓ The array of existing treatment and other health services for diabetics are rarely coordinated in a single care plan for the diabetic patient.
- ✓ There are not enough school-based or other child-oriented health promotion programs designed to prevent diabetes.

# Appendices

## Appendix A

### Physician Interview Questions

Name of Provider: \_\_\_\_\_

Telephone number: \_\_\_\_\_ City of Practice: \_\_\_\_\_

Type of provider:

\_\_\_ Family Practice

\_\_\_ General Practice

\_\_\_ Pediatrics

\_\_\_ Other, please specify:

\_\_\_ General Internal Medicine

\_\_\_\_\_

1. Have you had any difficulty accessing specialty consults for your diabetic patients?

Y

N

If so, which ones:

a. Vision Care (Ophthalmology, et al.)

b. Podiatry

c. Endocrinology

d. Nephrology

e. Cardiology

f. Vascular

g. Other, please specify:

\_\_\_\_\_

2. What non-physician services would you like to be able to refer your diabetic patients to that are currently not available in this county? Check each selection

- a. Nutritionist/Dietician
- b. Health Education
- c. Hearing and Speech
- d. Counseling
- e. Physical Therapy
- f. Transportation
- g. Social Work
- h. Other, please specify:

\_\_\_\_\_

3. Do you have any thoughts regarding what kinds of programs or services would be helpful in *preventing* diabetes in your county?

4. Do you feel that you have enough access to education and information on diabetes treatment and management?

Y N

If no, what do you need?

5. Would you like to be put on our mailing list for information about the activities and services of our diabetes team?

Y N

6. If **family practice or internal medicine**:

a. About how many adult diabetic patients are you currently seeing? \_\_\_\_\_

7. If **family practice or pediatrician**:

a. About how many child diabetic patients are you currently seeing? \_\_\_\_\_

b. Approximately what percentage of your child patients are overweight, but not necessarily obese? \_\_\_\_\_%

c. Approximately what percentage of your child patients are obese? \_\_\_\_\_%

## Appendix B

### Inventory of Available Resources

**Appalachian Rural Health Institute**  
Athens County Resources for Diabetic Residents

**PHYSICIANS**

*Diabetic Specialty Care*

**ARHI Diabetes/Endocrine Center** 108 Parks Hall Ohio University Athens OH 45701 (740) 593-2945  
Schwartz, Frank MD  
Shubrook, Jay DO

*Family Practice Physicians*

**Albany Family Medicine** 2364 Blizzard Lane Albany OH 45710 (740) 698-1900  
Myles, Wayne DO

**Athens Family Practice Clinic, Inc** 101 S Shafer St Athens OH 45701 (740) 592-4491  
Ortman, John MD  
Rothstein, Mark MD

**Flores and Flores** 55 W Columbus St Nelsonville OH 45764 (740) 753-1991  
Flores, Norma MD  
Flores, Reuben MD

**Holzer Clinic** 224 Columbus Road Athens OH 45701 (740) 589-3100

**Muntean, James DO** 400 E State St Athens OH 45701 (740) 592-4229

**Nelsonville Family Practice Center, Inc** 222 Meyers St Nelsonville OH 45764 (740) 753-4436  
Hottel, Joseph DO

**On Call Medical Associates** 510 W Union St Athens OH 45701 (740) 594-7979  
Coppinger, Imber DO  
Kemper, James DO  
Werrell, Bradley DO

**Steiner Family Medical** 22 S. Plains Road The Plains OH 45780 (740) 797-2026  
Steiner, Charles DO

**University Medical Associates**

Burns, Janet DO UOMC-Parks Hall 4th Fl Ohio University Athens OH 45701  
Clay, Steven DO UOMC-Parks Hall Ohio University Athens OH 45701  
Clem, Andrea DO 65 Hospital Dr Athens OH 45701  
Clem, Andrea DO UOMC-Parks Hall 4th Fl Ohio University Athens OH 45701  
Clothier, Maureen MD UOMC-Parks Hall Ohio University Athens OH 45701  
Gaines, Carol DO UOMC-Parks Hall 2nd Fl Ohio University Athens OH 45701 (740) 593-2516  
Presutti, Lenard DO UOMC-Parks Hall 2nd Fl Ohio University Athens OH 45701 (740) 593-2516  
Robles, Eduardo DO 294 Harper St Nelsonville OH 45764 (740) 753-3555  
Schreck, Edward DO 294 Harper St Nelsonville OH 45764 (740) 753-3555  
Schreck, Edward DO UOMC-Parks Hall 2nd Fl Ohio University Athens OH 45701 (740) 593-2516  
Shubrook, Jay DO UOMC-Parks Hall 2nd Fl Ohio University Athens OH 45701 (740) 593-2516  
Shubrook, Jay DO Coolville Healthcare Center 25716 Wilson Street Coolville OH 45723 (740) 667-3134  
Stroh, David N. DO Coolville Healthcare Center 25716 Wilson Street Coolville OH 45723 (740) 667-3134  
Tomc, Linda DO 499 Richland Ave Athens OH 45701 (740) 594-4476  
Wolf, John DO UOMC-Parks Hall 2nd Fl Ohio University Athens OH 45701

*Internal Medicine Physicians*

**Athens Center for Vascular and Internal Medicine**  
Purdy, W. Randolph DO 530 W Union St Athens OH 45701 (740) 594-3800

**Holzer Clinic** 224 Columbus Road Athens OH 45701 (740) 589-3100

**On Call Medical Associates** 510 W. Union St Athens OH 45701 (740) 592-2678  
Girijashanker, Rajagopal MD  
Ruksenas, Audrius MD  
Yellamraju, Umamahesh MD

**Patel, Halesh MD FACP, Inc.** 265 W Union St Athens OH 45701 (740) 594-7979

**Trimble Township Family Medical Clinic** 7 High Street Glouster OH 45732 (740) 767-3525  
Ayub, Hafiz MD

<b>York Township Medical Clinic</b> Ayub, Hafiz MD	Canal Street		Nelsonville	OH	45764
<b>Cardiology</b>					
<b>Central Ohio Cardiovascular Consultants, Inc.</b>	1950 Mt St Mary Dr		Nelsonville	OH	45764 (614) 486-2000; 800-486-2002
<b>Central Ohio Cardiovascular Consultants, Inc.</b>	542W Union Plaza		Athens	OH	45701 (614) 486-2000; 800-486-2002
<b>Holzer Clinic</b>	224 Columbus Road		Athens	OH	45701 (740) 589-3100
<b>Nephrology</b>					
<b>MacLaurin, John DO</b>	1950 Mount Saint Mary Dr		Nelsonville	OH	45764
<b>MacLaurin, John DO</b>	65 Hospital Dr		Athens	OH	45701 (740) 594-4722
<b>Ophthalmology</b>					
<b>Eye Physicians and Surgeons of Athens</b>	444 W. Union		Athens	OH	45701 (740) 592-4461
Dodrill, Craig H. MD McAdoo, Jeffrey F. MD					
<b>Ohio Valley Eye Physicians</b>	224 Columbus Road		Athens	OH	45701 (800) 758-3937
George, David S. MD Strickler, Scott H. MD Lazer, Zane P. MD					
<b>Podiatry, Foot Care</b>					
<b>Athens Foot Clinic</b>	410 East State Street		Athens	OH	45701 (740) 592-2366
Tan, Enrico DPM					
<b>Driggs, Earl L. DPM</b>	217 Columbus Road		Athens	OH	45701 (740) 592-5799
<b>Diabetes Screening, Education, Nutritional Counseling</b>					
<b>ARHI Diabetes Nutrition and Health Education Program</b>	Grosvenor West	Ohio University	Athens	OH	45701
<b>Physical Therapy</b>					
<b>Athens Physical Therapy</b>	603 West Union Street		Athens	OH	45701 (740) 593-8787
<b>Chiropractice Associates</b>	147 Columbus Road		Athens	OH	45701 (740) 593-5511
Mark, Sheila MS PT					
<b>Hickory Creek Nursing Center</b>	51 East 4th		The Plains	OH	45780 (740) 797-4561
<b>Holzer Clinic</b>	224 Columbus Road		Athens	OH	45701 (740) 589-3100
<b>O'Bleness Hospital</b>			Athens	OH	45701 (740) 593-5551
<b>Ohio University Therapy Associates</b>	86 Columbus Road	Suite 202	Athens	OH	45701 (740) 594-4023
<b>Southeast Ohio Sports Medicine &amp; Physical Therapy LTD</b>	215 Columbus Road		Athens	OH	45701 (740) 592-6900
<b>Dentists</b>					
<b>Athens Dental Depot</b>	80 Columbus Road		Athens	OH	45701 (740) 594-6000
Ginder, Michael D DDS					
<b>Biggs, William B DDS</b>	715 West Union Street		Athens	OH	45701 (740) 592-1377
<b>Conrath Family Dental Care</b>	495 Richland Avenue		Athens	OH	45701 (740) 594-3939
Nicole Conrath					
<b>Cuckler, William R DDS</b>	52 Lorene Avenue		Athens	OH	45701 (740) 592-1301
<b>James, Deborah DDS</b>	715 West Union Street		Athens	OH	45701 (740) 592-3018
<b>Riestenberg, Lavelle and Welsh</b>	207 Columbus Road		Athens	OH	45701 (740) 593-8530
Lavelle, Timothy C DDS Riestenberg, J L DDS Welsh, Elizabeth C DDS					
<b>Legg, C Alan DDS</b>	410 East State Street		Athens	OH	45701 (740) 592-6674
<b>Linscott, Gregory M DDS</b>	50 South Court Street		Athens	OH	45701 (740) 593-7493
<b>Mathews, R Craig DDS</b>	530 West Union Street	Suite A	Athens	OH	45701 (740) 592-1483
<b>Winland, Roger D DDS, Inc</b>	715 West Union Street		Athens	OH	45701 (740) 592-3018
<b>Spero, Robert L DDS</b>	715 West Union Street		Athens	OH	45701 (740) 593-3794
<b>Wootton, Michael D DDS</b>	17 Blue Line Drive		Athens	OH	45701 (740) 593-5037
<b>Oral Surgeon</b>					
<b>Monroe, Timothy V DDS</b>	410 East State Street		Athens	OH	45701 (740) 594-8207
<b>Orthodontist:</b>					

**Home Health Care**

Appalachian Community VNA Hospice & Health Services, Inc.	30 Herrold Avenue	Athens	OH	45701 (740) 594-8226
Home Health Care of Southeast Ohio	401 Dutch Ridge Road	Guysville	OH	45701 (740) 662-1222
Pleasant Valley Home Health, Hospice and Private Duty		Athens	OH	45701 (740) 992-6916

**Support Groups**

**Retail Items**

*Orthopedic Footwear*

**Home Medical Equipment**

Bowman's	48 E. Stimson Avenue	Athens	OH	45701 (740) 594-2100
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**Hearing and Speech Services**

Diles Hearing Center	275 West Union Street	Athens	OH	45701 (740) 594-3571	
Karr Audiology & Hearing Ads	499 Richland Avenue	Athens	OH	45701 (740) 594-6333	
Ohio University Speech/Language Services	Grover Center	Ohio University	Athens	OH	45701 (740) 593-1404

## **Appalachian Rural Health Institute**

### Hocking County Resources for Diabetic Residents

#### **PHYSICIANS**

##### **Diabetic Specialty Care**

##### **Family Practice Physicians**

<b>Charles R. Keller, DO, Inc</b> Keller, Charles DO	751 State Route 664 N		Logan OH	43138 (740) 385-6864
<b>Family Practice Assoc</b> Hayward, James DO	819 State Route 664 North	P.O. Box 228	Logan OH	43138 (740) 385-9614
<b>Anzalone, Scott MD</b>	751 D ST RT 664N	P.O. Box 839	Logan OH	43138 (740) 380-9537
<b>Cummin, David MD</b>	751 D ST RT 664N	P.O. Box 839	Logan OH	43138 (740) 385-9646
<b>Robert Jos Neff MD</b>	751 State Route 664 North			(740) 385-9484
<b>Douglas Ballard Carr MD</b>	819 State Route 664 North			(740) 385-9614
<b>Brian L Still DO</b>	49 East Hunter Street			(740) 385-5614

##### **Internal Medicine Physicians**

<b>Family Healthcare, Inc.</b> Kudlapur, Shivaprakash T MD Deka, Bharati MD	1383 West Hunter Street		Logan OH	43138 (740) 380-3730
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##### **Cardiology (Part time Services)**

<b>Advanced Cardiovascular Services</b> Reddy, Guru MD	819 St Rt 664 N		Logan OH	43138 (740) 380-8140
<b>Cardiology Associates Bellefontaine</b> Dixon, Evan MD Graber, Rodney MD Houser, William MD	2220 Timber Trail		Logan OH	43138

##### **Nephrology**

##### **Ophthalmology**

##### **Podiatry, Foot Care**

<b>Caplan, Edward DPM</b>	160 East Main Street		Logan OH	43138 (740) 385-2709
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##### **Diabetes Screening, Education, Nutritional Counseling**

<b>Hocking Valley Community Hospital</b> Denise Kiarny Katie Kudlapur	601 State Route 664 North		Logan OH	43138 (740) 380-8000
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##### **Physical Therapy**

<b>Hocking Valley Community Hospital</b> Ohio Rehabilitation & Diagnostic Center Inc Physical & Occupational Therapy Center	Outpatient Physical Therapy Center 1387 West Hunter Street 2197 East Front Street	416 West Hunter Street	Logan OH	43138 (740) 385-8759 43138 (740) 593-7750 43138 (740) 380-8284
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##### **Dentists**

<b>Blankenbeckler, Jeffrey A DDS</b> (fits dentures)	1381 West Hunter Street		Logan OH	43138 (740) 385-9681
<b>Griggs, Donald E Jr. DDS</b>	160 South Mulberry Street		Logan OH	43138 (740) 385-2631
<b>Leonard, W. Robert DDS</b>	8 East Hunter Street		Logan OH	43138 (740) 385-8600
<b>Merrill, Robert P DDS</b>	160 South Mulberry Street		Logan OH	43138 (740) 385-8640
<b>Smith, John P Jr. DDS</b>	91 West 2nd Street		Logan OH	43138 (740) 385-2094

##### **Oral Surgeon**

##### **Orthodontist:**

**Home Health Care**

<b>Fairfield Visiting Nurse Association</b>	31500 Chieftain Drive Apt C		Logan	OH	43138 (740) 380-0305
<b>Southeastern Ohio Elder Care</b>	N. Columbus	P.O. Box 918	Logan	OH	43138 (740) 385-7800
<b>Approved Home Health</b>	340 East Hunter St		Logan	OH	43138 (740) 380-9990
<b>Healing Hands Home Health</b>	30605 Stage Coach Road		Logan	OH	43138 (740) 385-0710

**Support Groups**

**Retail Items**

*Orthopedic Footwear*

*Home Medical Equipment*

**Hearing and Speech Services**

<b>Hocking Valley Community Hospital</b>	819 State Route 664 North		Logan	OH	43138 (740) 380-8140
<b>- Specialty Services</b>					

## Appalachian Rural Health Institute Pike County Resources for Diabetic Residents

### DIABETES SCREENING, EDUCATION, NUTRITIONAL COUNSELING

Pike County Family Health Services Contact: Cindy Balzar CNP	227 Valleyview Dr.	Waverly OH	45690 (740) 947-7726
Pike County Health Department Contact: Raylene Maloy, RN	229 Valleyview Dr.	Waverly OH	45690

### HEARING AND SPEECH SERVICES

Adena Rehabilitation Services	12340 State Route 104	Waverly OH	45690 (740) 941-5170
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### HOME HEALTH CARE

Pike County Home Health Agency	229 Valleyview Dr.	Waverly OH	45690
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### ORAL HEALTH CARE

<b>Davis, Stacy L DDS</b>	14062 US Highway 23, Suite B	Waverly OH	45690 (740) 947-1990
<b>Frost, Lisa K DDS</b>	100 East Third St	Waverly OH	45690 740-947-8200
<b>Hanners, Chris &amp; Associates</b> Hanners, Chris DDS Kelley, Paul M DDS	559 South West Street	Piketon OH	45661 (740) 289-4218
<b>Martin, David DDS Inc</b>	106 Caudill Road	Waverly OH	45690 (740) 947-9380
<b>Palm, John DDS</b>	7777 US Highway 23	Piketon OH	45661 (740) 289-3508
<b>Piketon Family Health Center</b>	7777 US Route 23	Piketon OH	45661 740-289-3508
<b>Schmitt, Robert B DDS</b>	216 East North Street	Waverly OH	45690 740-947-5044

#### *Oral Surgeon*

<b>Center for Oral &amp; Facial Surgery</b> <i>Orthodontist:</i>	13740 U.S. Highway 23	Waverly OH	45690 740-947-8707
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### PHYSICAL THERAPY

Adena Rehabilitation Services	12340 State Route 104	Waverly OH	45690 (740) 941-5170
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### PHYSICIANS

#### *Diabetic Specialty Care*

#### *Family Practice Physicians*

<b>Waverly Family Health Center</b> Dass, Joan I MD Narvel, Faozan A MD	227 Valleyview Dr.	Waverly OH	45690 (740) 947-7726
<b>Beaver Family Health Center</b> Yerramilli, Venkata R MD	7046 State Rte 335	Beaver OH	45613 740-226-1924
<b>Adena Health Center</b> Graham, Gary F MD Kittaka Jr, Harry T MD Wy, Tomas Wong MD	12340 State Route 104	Waverly OH	45690 (740) 941-5180
<b>Bristol Village Physicians</b> Tyree, Robert F MD	621 E. 5th St.	Waverly OH	45690 (740) 941-5290

<b>Kessler, David Robert MD</b>	Pike Professional Building	100 Dawn Lane, Suite 4	Waverly OH	45690 740-947-7591
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#### *General Practice Physicians (with diabetic emphasis)*

<b>Piketon Family Health Center</b> Schlie, Daniel E. MD	7777 US Route 23	Piketon OH	45661 740-289-3508
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#### *Geriatric Medicine Physicians*

#### *Internal Medicine Physicians*

<b>Pike Medical, Inc.</b> Daniel K. Madsen DO	13800 US Highway 23	Waverly OH	45690 740-774-1100 (740) 947-8602	
<b>Roddy, David Eugene MD</b>	Pike Professional Building	100 Dawn Lane, Suite 4	Waverly OH	45690 740-947-7591
<b>Piketon Professional Center</b> Skinner, Carmen DO Valley, Thomas Clifford MD	100 Indian Ridge Drive	Piketon OH	45661 740-289-1548	

**Cardiology**

**Nephrology**

**Ophthalmology**

**PODIATRY, FOOT CARE**

**Paul Cwilka DPM**  
**Waverly Foot Care**  
Arthur Kelly O DPM

100 Hilltop Dr.  
307 E. Emmitt Ave.

Waverly OH 45690 (740) 947-2499  
Waverly OH 45690 (740) 947-2157

**RETAIL ITEMS**

*Orthopedic Footwear*

*Home Medical Equipment*

**SUPPORT GROUPS**

**Pike County CODA Chapter**

c/o Donna Moore

Waverly OH (740) 493-3874

# Appalachian Rural Health Institute Vinton County Resources for Diabetic Residents

## PHYSICIANS

### *Diabetic Specialty Care*

#### *Family Practice Physicians*

<b>Family Healthcare, Inc.</b> Wy, Tomas MD Crapes, Susan MD (part time) Murray, Dawn DO (part time)	31891 State Route 93	McArthur OH	45651 (740) 596-5249
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#### *Internal Medicine Physicians*

##### *Cardiology*

##### *Nephrology*

##### *Ophthalmology*

## Podiatry, Foot Care

### Diabetes Screening, Education, Nutritional Counseling

<b>Family Healthcare, Inc.</b>	31891 State Route 93	McArthur OH	45651 (740) 596-5249
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## Physical Therapy

## Dentists

<b>Alvarez Joseph V DDS</b>	203 South Market Street	McArthur OH	45651 (740) 596-5472
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### *Oral Surgeon*

### *Orthodontist:*

## Home Health Care

Twin Maples Home Health Care Vinton County Health Department	63044 USHighway 50	McArthur OH	45651 (740) 596-1022
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## Support Groups

## Retail Items

### *Orthopedic Footwear*

### *Home Medical Equipment*

## Hearing and Speech Services