



# SpecialtyHealth

SPECIALISTS IN MANAGED HEALTHCARE & PREVENTION

**The Science supporting the SpecialtyHealth Police Wellness and Prevention Program. Prepared for the FOP and the IACP, Washington, DC August 26 and 27, 2015. Chief Steve Pitts, RPD (ret); Assistant Chief Ron Glensor, RPD (ret); Deputy Chief Todd Renwick, UNR; Chief Steve Keefer, City of Sparks (ret); Chief Joe Monroe, University of Kentucky; Chief Harry Kubojiri, Hilo, Hawaii; Deputy Director Chris Shaefer ATF, Washington, DC; SSA Russell Kleber, Quantico, VA; Dr. Bill Cromwell, FNLA, Raleigh, NC and Dr. E. James Greenwald, Reno, NV (Dr. Cromwell's Lipidology input is yellow highlighted, thank you Bill!)**

In terms of officer wellness, preventing heart attacks would appropriately be a very high priority for most police departments. Many agencies also mention Type 2 Diabetes and weight issues as a serious problem<sup>1</sup>. It is not widely appreciated that "insulin resistance is likely the most important single cause of coronary artery disease" and that "in young adults preventing insulin resistance is predicted to prevent approximately 42 percent of heart attacks"<sup>5</sup>. It should also be noted that before anyone becomes Type 2 Diabetic they first go through a transitional phase of insulin resistance. Insulin resistance can therefore be appreciated as the root cause of many heart attacks and Type 2 Diabetes.

In a healthy state, insulin works in liver, muscle, and fat cells to maintain normal blood sugar levels. Insulin resistance occurs when these cells become resistant to insulin stimulation. The earliest effects of insulin resistance are seen in the way the body produces and transports cholesterol and triglycerides. These blood fats are transported in the circulation inside vehicles called lipoprotein particles. Common lipoprotein particles include LDL (low-density lipoprotein), HDL (high-density lipoprotein), and VLDL (very-low density lipoprotein). Of these, the LDL particles are most directly related to the development of heart disease. When LDL levels are high, LDL particles deposit in the artery wall and promote plaque formation. Unfortunately, insulin resistant patients frequently overproduce LDL and clear LDL poorly. This results in an increased number of circulating LDL particle number early in insulin resistant people, which in turn drives the development of early heart disease in these individuals<sup>2</sup>.

<sup>1</sup> Personal conversations with Hilo, Hawaii; University of Kentucky Police; and Fallon, Nevada police and sheriff.

<sup>2</sup> Personal communication, Dr. William Cromwell, FAHA, FNLA, April 2015.





In contrast, blood sugar levels are minimally elevated in early insulin resistance for many years. This is because our bodies compensate for a poor cell response to insulin by simply producing more insulin to maintain a normal blood sugar level. Over time this compensation fails and insulin levels decline. With decreasing insulin, blood sugar levels rise, eventually leading to the development of Type 2 Diabetes as a late feature of insulin resistance<sup>3</sup>.

The commonly expressed belief that “cops die young” is supported by the literature. Sheriff Jack Parker’s recent Florida Mortality Study is particularly sobering. The average age of death for police officers and correctional officers in Florida is 62.4 years, 12 years less than the general population<sup>6</sup>. The question is often asked, “Why do cops die young?” After reviewing thousands of police physical examinations over a 14-year period the RPD and their partners at SpecialtyHealth now believe that unrecognized and untreated insulin resistance is most commonly the answer. There are many factors that predispose first responders and police in particular to insulin resistance, including:

- Hypervigilance<sup>7</sup>
- Sugar, High Fructose Corn Syrup and Carbohydrates<sup>8</sup>
- Gluten Intolerance<sup>9</sup>
- Sleep Deprivation/Shift Work; Overtime<sup>10</sup>
- Lack of exercise<sup>11</sup>, and;
- Genetics<sup>12</sup>

The effort undertaken by the RPD and its partners at SpecialtyHealth, to diagnose and reverse insulin resistance early in police and other first responders, is unique and innovative. In Nevada, a conservative estimate, of the incidence of insulin resistance in actively working, younger law enforcement professionals are 30 to 35 percent. This percentage becomes even higher in retired officer groups.

Additionally, advanced testing completed on over 100 senior law enforcement executives from all over the world, at the FBI National Academy’s Law Enforcement Executive Development Seminar (LEEDS) class over a two-year period (2012 to 2014), revealed a rate of insulin resistance in excess of 50 percent. Insulin resistance increases with age and the FBI LEEDS class is often a senior law enforcement executive group. Not one of the Quantico LEEDS volunteers was aware of their correct diagnosis!! .!

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<sup>3</sup> Personal communication, Dr. William Cromwell, FAHA, FNLA, April 2015.





## Advanced Lipid and Diabetes Mellitus (DM2) Testing

Routine cholesterol measurements are commonly used to estimate the number of lipoprotein particles in which cholesterol is carried. Unfortunately, the amount of cholesterol inside lipoprotein particles is so variable that many patients, especially those with insulin resistance or Type 2 Diabetes do not have good agreement between routine cholesterol measures and the actual number of lipoproteins present<sup>4</sup>. This disagreement (called discordance) is especially common in insulin resistant officers and every law enforcement group SpecialtyHealth has studied has had insulin resistant officers in abundance. Nationally one half of the 1.5 million people having heart attacks annually in our country present to the emergency room with “normal or near normal” cholesterol levels measured by routine testing.<sup>13</sup> frequently, these people are insulin resistant. Fortunately, more accurate measuring techniques are now available. In Nevada, the extensive use of a more reliable lipid test, the nuclear magnetic resonance (NMR) LipoProfile test by LabCorp, has greatly improved lipoprotein measurement and facilitated the early identification of insulin resistant officers. This test uses magnetic resonance technology (an MRI) to directly measure the number of lipoprotein particles carrying cholesterol and triglyceride molecules throughout the body. Every human needs these two critical fats. We now know that the total number of lipoprotein particles (LDL-P) gives us a better assessment of true cardiovascular risk, especially in the insulin resistant officer.<sup>14</sup> The evidence supporting this testing is extensive (15,000,000 samples, 500+ peer reviewed papers, and nine major trials). A simple way to express this testing superiority to police is to say “It’s not the PASSENGERS (the cholesterol number LDL-C) It’s the CARS (LDL-P the particle number). The Cars: the total number of LDL particles carrying both cholesterol and triglyceride. LDL-P is the critical number that we really do need to know.

“It’s not the Passengers, it’s the Cars. It’s the Cars that cause the scars”<sup>5</sup>

This simple little rhyme has been repeated in police departments all over Nevada and beyond, including six times at the FBI National Academy. It has helped many officers grasp this important and potentially lifesaving concept. When the LDL lipoproteins cross the arterial wall they are broken down and form plaque, that’s the scar. Over time as plaque accumulates it can become unstable and rupture, that’s the heart attack. So, stated as simply as possible, **THE HIGHER THE LDL-P, THE PARTICLE NUMBER, THE GREATER THE HEART ATTACK RISK.** It helps to think of the cholesterol molecules as just being along for the ride. Especially in the

<sup>4</sup> Personal communication, Dr. William Cromwell, FAHA, FNLA, April 2015.

<sup>5</sup> The Particle Song, first performed by Mr. Wayne Carlson, PACT, September 2011.

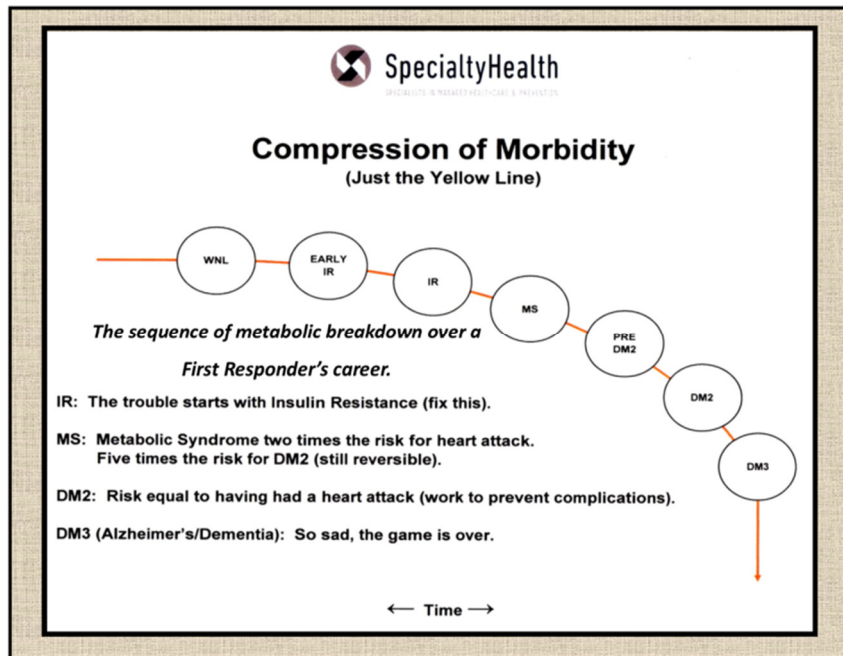




insulin resistant officer. **LDL -C is so often an underpowered marker. It underestimates the problem easily 50% of the time.** (Library)

Beyond LDL-P, the NMR also reports an insulin resistance score (0 to 100, a score over 45 indicates insulin resistance is in play). **The elevated insulin resistance score is the first clue that the metabolic breakdown preceding metabolic syndrome pre-diabetes and Type 2 Diabetes has begun.** It really does boggle the mind to speculate about how much human tragedy could be avoided, and how much money that could be saved, if all the insulin resistant police officers in the nation were properly identified early and appropriately treated!

The following diagram demonstrates the sequence of metabolic breakdown too frequently seen over a police officer's career. The trouble starts with insulin resistance and then proceeds to metabolic syndrome. Metabolic syndrome represents a cluster of signs and symptoms that become apparent as metabolic breakdown advances. These findings include increased abdominal obesity, increased triglycerides, decreased HDL (the good cholesterol), elevated blood pressure and elevated sugar levels (see appendix A, Case One where the officer was positive for all five markers). Three out of five positive findings confirms the diagnosis of Metabolic Syndrome.<sup>15</sup>



As the metabolic breakdown progresses, heart attack risk increases with each step. When a diagnosis of metabolic syndrome is made, heart attack risk has already doubled. A diagnosis of Type 2 Diabetes is the risk equivalent of having had a heart attack already.<sup>16</sup> Elevated insulin





levels are the “hallmark” of insulin resistance and start the cascade towards metabolic syndrome and DM2. A hint that the process has begun can frequently be detected on routine lab work. We look for an elevated triglyceride and low HDL on routine testing. In 2005, Stanford’s famous Diabetologist Dr. Gerald Reaven and his team asked “Is there a simple way to identify insulin-resistant individuals at increased risk of cardiovascular disease?”<sup>17</sup> The answer was yes - “a TG/HDL ratio of equal to or greater than 3.5 provides a simple means of identifying insulin resistant, patients likely to be at increased risk of cardiovascular disease”. This was an epiphany early in the program! Dr. Reaven’s ratio became our early sorting mechanism. So often this ratio was elevated and insulin resistance was in play. Frequently, in police populations, we now notice that the NMR insulin resistance score becomes abnormal even before the TG/HDL ratio. **The insulin resistance score is now the most sensitive way to identify IR outside of a research setting** (Cromwell University of Kentucky conference with Chief Joe Monroe, May, 2015). We always look carefully at both numbers so that we can intervene at the earliest opportunity. Understanding that insulin resistance is the precursor to metabolic syndrome, many heart attacks and Type 2 Diabetes is a fundamental principle. The earlier we diagnose insulin resistance, the easier it is to REVERSE this dangerous cascade. With NMR testing, it is possible to see DM2 coming 15 to 20 years in advance.<sup>ii</sup> Insulin resistance can correctly be considered “the canary in the coal mine.” and we strongly recommend that it be targeted specifically. The RPD has implemented a program that checks the TG/HDL ratio on the yearly physicals. Officer’s with a ratio of greater than 3.5 for males and 2.5 for females are encouraged to get NMR testing and enter the Specialty Health program.

## **Reno Police Department and Resiliency**

Considering all of the scientific information, Chief Steve Pitts and the RPD have posed the question, “Why, if a police department routinely invests part of its budget to maintain its fleet of vehicles, is it not investing in the health and wellness of its officers, its most valuable resource.” The RPD’s extensive wellness and resiliency program has emerged and grown out of this very basic question.

In 2008, the RPD initiated a pilot program in partnership with SpecialtyHealth and Dr. James Greenwald. The initial program included 15 volunteer officers who were given advanced lipid screening followed by an intensive six-month program. Of the 15 officer initially screened, nine had been pre-selected because of an elevated TG/HDL ratio noticed on the annual physical. All 15 officers then entered a program that included nutritional advice, exercise counseling, lab-directed health coaching and sometimes pharmacology. After the intervention period was completed all 15 officers were reevaluated. The nine insulin resistant officers had all significantly reduced their risk factors, some as quickly as within four months (see Appendix A, Case Two).<sup>18</sup> In all cases, ongoing improvement was clearly communicated with a “traffic light” display that is





easy to understand (see examples in Appendix A). We are now very confident that trained police officers can understand insulin resistance and its treatment process.

It was also determined that the testing and follow-up interventions had not only, probably, saved and extended lives, it had also produced a very significant cost savings. Thirty-seven (37) of the fifty (50) United States are “presumptive-benefit states”, meaning that, if a public safety officer has a heart attack after a period of employment, that heart attack is presumed to be work related and is paid for by the employer’s workers compensation program. Employers are required to “reserve” funds to cover this expense. In 2012, Nevada employers were reserving \$1.2 million to cover both the medical and disability costs of an accepted heart claim. Costs have escalated and in 2015 the required reserve is \$1.5 million per accepted claim. Using these numbers, the RPD projected that that costs could have easily been \$10.8 million for this high risk pilot group.<sup>iii</sup> The preventative costs for all 15 officers over a 20-year period were estimated at \$505,560. This represented a 20-to-1 return on investment (ROI) for the program.<sup>19</sup> (Cox this paper is available in your Library).

## Growth of the Reno Police Department Wellness Program

The success of Reno’s initial program has led to the institution of an overall wellness or “resiliency” policy in the agency that includes multiple components such as:

- **Advanced Testing** - RPD has expanded on the original program and currently includes both the police and fire department. Officers and other first responders with test results that put them into the “at-risk” category are given the option of becoming part of the SpecialtyHealth intervention. The program is voluntary and officers who may benefit from the advanced testing are identified through their annual physical which is mandated by the state.
- **Nutrition** – In the early years (2002 to 2005), the SpecialtyHealth program was following the standard American Heart Association/American Dietetic Association dietary guidelines which endorse a high carbohydrate, low fat, grain based diet. This dietary intervention failed to improve critical blood lipid parameters and frequently worsened insulin resistance scores while elevating triglycerides and decreasing HDL cholesterol. The low fat approach of the early years appears to be losing popularity, especially recently. Since 2007, and with the RPD group, SpecialtyHealth has recommended a Paleo/Low-Carb type of intervention that has consistently improved markers of systemic inflammation, insulin resistance, and body composition<sup>iv</sup>. Although still debated in some dietetic circles, this alternative approach seems to be gaining considerable momentum. To quote a recent mainstream article. “An enormous trove of research over the past decade







has shown that a low carbohydrate regime consistently outperforms any other diet in improving health. Diabetics, for instance, can most effectively stabilize their blood glucose on a low-carb diet; heart disease victims are able to raise their “good” HDL cholesterol while lowering their triglyceride. And at least two-dozen well controlled trials involving thousands of subjects have shown that limiting carbohydrates leads to greater weight loss than does cutting fat.”

- **In 2011, Robb Wolf, New York Times, bestselling author of *The Paleo Solution*, moved to Reno. Robb’s approach combining fundamentally solid nutritional information with exercise and sleep advice is effective and popular. It has been very well received by Nevada’s first responder community. We frequently say that, “Paleo is PERFECT for first responders”.**
  
- **Exercise** - The physical demands of police officers can be quite variable. Exercise physiology analysis clearly illustrates police work as anaerobic (power output in excess of VO<sub>2</sub> max) and more akin to the needs of a wrestler or football player than a marathon runner. As such, the RPD found significant benefits in strength and conditioning approaches which develop the attributes of strength and power via the Conjugate Periodization Method. This method allows for the development of several attributes over the course of a few weeks (meso-cycle) allowing for customization based on recovery, orthopedic issues, arrest and control training, etc. The primary training attributes include:
  - **Functional mobility.** Police work is highly repetitious and addressing imbalances is critical in preventing common orthopedic problems such as lower back injuries.
  - **Maximum strength.** Compound barbell movements are used to improve neuromuscular efficiency and full body strength.
  - **Rate of Force Production.** A police officer must not only be strong but must also be proficient in “turning on” movements with significant speed and power. Barbell and dumbbell variants of the Olympic lifts are generally our first choice for this work.
  - **Metabolic conditioning.** Short circuits involving sprints, obstacle course work, and high repetition bodyweight movements are used to improve both local muscular endurance and cardiovascular efficiency via peripheral heart action. These circuits provide a stimulus more akin to an arrest-and-control scenario than traditional low powered cardiovascular training.<sup>22</sup>





- **Wellness Committee** - The RPD has a well-organized and robust Wellness Team that serves as the “go to” place for officers in the department looking for information and/or services related to wellness and resiliency. Through the RPD’s relationship with SpecialtyHealth, the Wellness Team also assists with referrals of “at risk” officers. Members of the wellness committee are trained to go over the advanced testing results with officers as well as assist them with creating and implementing a plan to help them meet their overall wellness goals. This part of the program has proven to be invaluable as police officers tend to be more comfortable talking to and taking guidance from “one of their own”.

In addition to its work with at-risk officers, the RPD Wellness Team also seeks to provide assistance and resources to advance wellness and resiliency throughout the entire department. Some of the other programs that they have implemented include:

- a. Approved POST training that defines wellness certification for law enforcement and how wellness should be implemented;
- b. a quarterly newsletter that shares various types of wellness information as well as an RPD Wellness Facebook page that allows officers to network and share health related information;
- c. a certification program for physical fitness specialists in the community and police personnel to become certified to coach and supervise wellness;
- d. Community Connection - The Wellness Team has created partnerships with local businesses to promote wellness culture within police departments. For example, they have created a partnership with the local co-op to allow officers to come by to pick up a discounted healthy meal. Additionally, they have also negotiated reduced membership discounts for local gyms;
- e. Annual Wellness Clinic - Each year the RPD puts on a wellness fair/clinic for officers and their families that includes speakers on the topics of nutrition, exercise, emotional survival and sleep, as well as booths and other informational resources;







- f. LEO Defense Systems Training - The RPD provides officers with a ground defense course that utilizes jiu jitsu training. This type of training, which focuses on teaching officers' techniques for separating themselves from the offender so that they can utilize other non-lethal tools necessary for control, has been shown to reduce injuries to both officers and suspects during altercations.
- **Emotional Survival** - In 2002, Dr. Kevin Gilmartin, in his book *Emotional Survival for Law Enforcement*, observed that for police officers and first responders, their jobs can become the central and defining aspects of their lives. This can have a great impact on their lives and relationships outside of work. As a result, the officer or first responder may become physically and emotionally absent causing strained marriages and families. Other issues that arise include alcohol and substance abuse and a decline in the officers' physical health and wellness. Further, research by John Violanti and his colleagues reports that the average suicide rate in the police profession is seventeen per hundred thousand, second only to military personnel who average twenty per hundred thousand.<sup>23</sup>

In an attempt to proactively address these potential issues, the RPD has partnered with Dr. Eric Potterat of the U.S. Naval Special Warfare Command. Dr. Potterat provides officers with training and techniques used by Navy Seals to increase their mental preparedness and their ability to handle the stresses related to the job. The RPD and Dr. Potterat share the view that law enforcement and the military require very similar skill sets and training. Providing law enforcement officers with this type of mental preparedness training may go along well with improving officers' quality of life, both at home and on the job.

In addition to the mental preparedness training described above, the RPD has contracted with local psychological services to provide immediate interventions following traumatic events in the field such as child homicides and heavy casualty events such as the Reno air show disaster which killed 11 people and injured 69 others.

- **Sleep** - Sleep disorders are another area that can impact officer wellness. In policing, shift work, lack of sleep and adequate rest impact safety, performance, decision making, organizational risks and the health of our men and women serving. The RPD has worked with Dr. Kirk Parsley, a nationally recognized expert in the field of sleep medicine as a performance enhancing tool, and a readily available tool to mitigate almost all disease and safety risks. Dr. Parsley is a former member of the U.S. Naval Special Warfare Command, and spent





years working with service personnel identifying disorders and recommending solutions. Some examples of acute sleep restriction performance changes can include increase hours of wakefulness, decreased libido, increased daytime hunger, decreased insulin sensitivity, and decreased executive functioning. Each of these negative outcomes can also result in increased risk of injury.<sup>24</sup>

All of these outcomes from poor/reduced sleep can have a dramatic effect on an officer's overall wellness as well as their ability to perform at peak level while on duty. As a result, the RPD seeks to educate officers on the importance of sleep and the dramatic effects of sleep deprivation. Dr. Parsley has spoken at the RPD's annual wellness clinics in the past and is scheduled to do so again this year. Police leaders and administrators would do well to consider sleep deprivation research when considering implementing new shift rotations and/or lengths of shifts within their departments.

Additionally, RPD has expanded its relationship with SpecialtyHealth and has increased the number of officers who are given advanced screening and, for those deemed at-risk, intervention through the partnership with SpecialtyHealth. The costs are covered by the department. Chief Pitts began funding this program through grants but it is now included as a part of the departmental annual budget and allows for the selection of 15 officers per year to be added to the program. The cost is approximately \$1000 per IR officer and includes consultation, lab work and follow up.

## Replication

The RPD's resiliency and wellness program is well-positioned to be broadly replicated in departments throughout the United States. As an outgrowth of the program in Reno, there are currently plans underway to run similar pilot programs in Kentucky, Hilo, Hawaii, California and Washington D.C. SpecialtyHealth and the RPD have proposed a Train-the-Trainer approach for these agencies that will include certifications of select individuals within these police departments and will provide them with the tools and training needed to collect the necessary biometrics and assist with the identification of insulin resistance and other critical health issues. SpecialtyHealth will provide consultation for a risk assessment that will be done after bloodwork is completed at one of a network of labs that are easily accessible throughout the country. These agencies, as well as any future agencies that participate in the program would be supported by local doctors and through a network of physicians working with SpecialtyHealth. Beyond the Train the Trainer program an individual solution designed to provide officers and their physicians the critical sorting information so often needed has recently become available ("The Renwick Solution", see your Library)





## Conclusion

The growing health challenges facing our general population today, as a result of a rapid increase in Type 2 Diabetes, obesity and heart disease, appears to be even more pronounced in our police and first responder communities. The Reno Police Department's wellness and prevention program proactively addresses these issues in a manner that is comprehensive, cost-effective and efficient. The program includes many components that contribute to its effectiveness but the critical issue of addressing insulin resistance early in an officer's career is a central component of the program. Promoting and advocating for early and advanced screening of police and other first responders we believe will go a long way towards reducing heart attack, stroke and Type 2 Diabetes, and also improve the overall ability of officers to perform their jobs to the best of their abilities.

Selected Police cases will be available to illustrate the points made above. Thanks so much Chief Steve Pitts, Deputy Chief Todd Renwick, Dr. Bill Cromwell and Dr. E. James Greenwald, August 19, 2015.

## ENDNOTES

<sup>1</sup> (National Law Enforcement Officers Memorial Fund, 2014)

<sup>2</sup> (Greenwald, 2014, June)

<sup>3</sup> (Chief Steve Pitts, 2014, November)

<sup>4</sup> This section of the report was primarily authored by Dr. James Greenwald of SpecialtyHealth, Reno, NV.

<sup>5</sup> (Eddy, D., Schlessinger, L., Kahn, R., Peskin, B., & Rick Schiebinger, 2009)

<sup>6</sup> (Parker, J., 2011).

<sup>7</sup> (Gilmartin, K., 2002)

<sup>8</sup> (Taubes, G., 2010)

<sup>9</sup> (Wolf, R., 2010)

<sup>10</sup> (Parsley, K., 2014).





<sup>11</sup> (“Preparing Americans to Serve in the Military,” n.d.)

<sup>12</sup> (Strom, K., Fox, B., & Gerald Reaven, 2000)

<sup>13</sup> (Dr. Robert Superko, 2003, November)

<sup>14</sup> (Otvos, J., Mora, S., Shalaurova, I., Greenland, P., Mackey, R., & David Goff, 2011)

<sup>15</sup> (Taubes, G., 2010)

<sup>16</sup> (Strom, K., Fox, B., & Gerald Reaven, 2000)

<sup>17</sup> (McLaughlin, T., Reaven, G., Abbasi, F., Lamendola, C., Saad, M., Waters, D., Simon, J., & Ronald Krauss, 2005)

<sup>18</sup> (Pitts, S., 2014, August)

<sup>19</sup> (Pitts, S., 2014, August)

<sup>20</sup> (Teicholz, N., 2014, November 29)

<sup>21</sup> (Wolf, R., n.d.)

<sup>22</sup> (Pitts, S., 2014, August)

<sup>23</sup> (Gilmartin, K., 2002)

<sup>24</sup> (Parsley, K., 2014)





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<sup>i</sup> Let's Look Under the Hood, Presentation to the FBI national Academy

<sup>ii</sup> Opportunities for Using Lipoprotein subclass profile by Nuclear Magnetic Resonance Spectroscopy in Assessing Insulin Resistance and Diabetes Prediction. Alexis, C. Frazier-Wood et al. Tara Dahl, Timothy Garvey Metabolic Syndrome and Related Disorders Review 2012.

<sup>iii</sup> Cox, Jacqueline (2012) Specialty Health, Review of Nevada State Retirement and Workers Compensation Benefits.

<sup>iv</sup> In November 2011 Robb Wolf (author of *The Paleo Solution*), moved to Northern Nevada and became affiliated with Specialty Health. His comprehensive Paleo approach to diet as well as his emphasis on exercise and sleep has been enthusiastically received by the police in Reno.