



## SECTION FIVE:

# THE Methodology USED TO Determine THE Health Priorities

### *Introduction*

The mission of the public health system is to protect and promote the health of the people of Wisconsin. Accomplishing this mission requires that the public health system work to reduce the occurrence and minimize the impact of disease and injury that affect the people of this state. This is a complex and difficult task. Each year thousands of different adverse health conditions occur in Wisconsin affecting millions of persons. Indeed, it is likely that in a typical year, disease or injury will, to some degree, affect nearly all of the five million Wisconsin citizens. The impact of these conditions on individuals varies greatly. Some conditions are mild and have little or no impact on the day-to-day functioning of affected individuals; some conditions are life altering and life threatening. The number of persons affected by different conditions also varies widely. Some are very rare, and some affect tens of thousands of persons in Wisconsin each year.

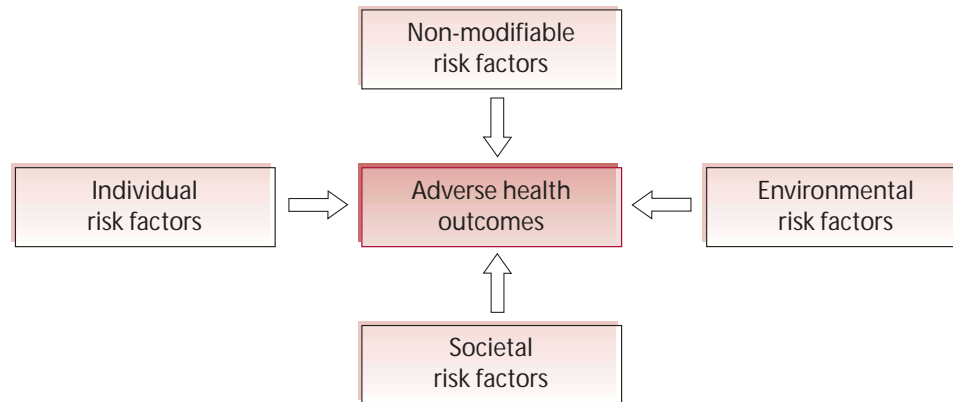
Given the large number of different diseases and injuries that can occur each year in Wisconsin, the Wisconsin Turning Point Initiative recognized the need to identify health priorities for Wisconsin's public health system. To address this need, the Data Expert Advisory WorkGroup (DEAG) was created, with its members appointed by the Administrator of the Wisconsin Division of Public Health. This interdisciplinary and intersector workgroup included public health scientists, epidemiologists and other experts, representation from the Division of Public Health, local health departments, institutions of higher education, health care providers, health systems, and others.

The DEAG was charged with the responsibility of developing a process for identifying the health priorities for the public health system. As part of this charge, the DEAG priority-setting process was to employ a scientific basis and be data driven. The DEAG would be advisory to the soon to be appointed Turning Point Transformation Team.

In the past, many health plans were “disease based,” that is, many goals and objectives were related to specific disease processes. For example, goals might include reduction of heart disease, HIV infection or low birth weight. To be comprehensive, this approach inherently resulted in the need for many goals and objectives. Because DEAG was charged with developing a process that would result in a limited number of health priorities a new approach was needed. Therefore, early on it was decided to develop a risk factor-based approach to priority setting.

Risk factors are conditions that increase the likelihood that exposed individuals will experience adverse health outcomes. These include primary risk factors that are associated with the development of disease or injury and also secondary risk factors that contribute to poor health outcomes for persons with existing disease or injuries.

In the DEAG process, risk factors were conceptualized within four domains. These domains are non-modifiable risk factors, environmental risk factors, societal risk factors, and individual risk factors (Figure 1). Non-modifiable risks include such factors as age, sex, heredity, family history and others that cannot be readily altered. Environmental

**FIGURE 1** Relationship of risk factors and adverse health outcomes

risks are a direct result of the influence of the physical environment on individual's health. Environmental risks include exposure to harmful substances in the air, water and from other sources. Societal risks include factors such as poverty, discrimination and lack of educational attainment that occur at the societal level and are associated with poor health outcomes. Individual risks are often behaviors and include factors such as smoking, exercise, diet and others. While this framework provides a useful way of viewing the relationship between risk factors and adverse health outcomes DEAG recognized that this is a simplified conceptualization and that the four domains interact and influence each other in complex ways.

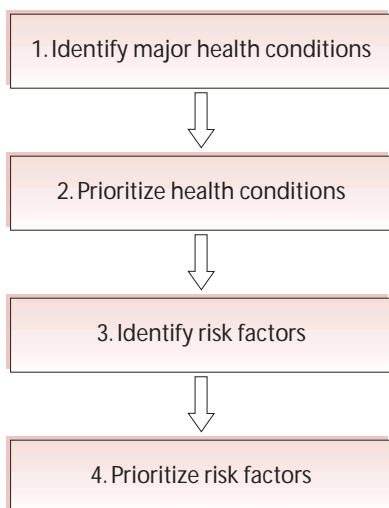
The assumption of underlying risk factor-based priority setting is that because there is an association between risk factors and adverse health outcomes, a reduction in the occurrence of risk factors in a population will have a positive effect on the health of individuals within that population. Furthermore, although some risk factors are associated with a single disease, often specific risk factors contribute to multiple conditions, disease, and adverse health outcomes. For example, smoking may place individuals at risk for heart disease, stroke, lung and other cancers, emphysema, asthma, and other conditions. This leverages the benefit that may result from a reduction in the occurrence of a relatively small number of carefully chosen risk factors.

The specific DEAG assignment was, therefore, two-fold. First, DEAG was to devise a process that could identify the important risk factors for major adverse health outcomes in Wisconsin. Second, using this process, DEAG was to deliver to the Transformation Team a prioritized list of the important risk factors that have a major affect on the health of the people of Wisconsin. It is important to note, however, that the prioritized risk factors are not health priorities, but rather were intended to inform the process of identification of health priorities by the Transformation Team.

### **Overview of the Prioritization Process**

The DEAG developed a four-step process to identify the risk factors that had the greatest affect on the health of the people of Wisconsin. Figure 2 shows the steps in this process. The purpose of Steps 1 and 2 was to identify and prioritize the major health conditions that affect the Wisconsin population. After the priority health conditions were identified, the purpose of Step 3 was to compile a comprehensive list of the risk factors that contributed to these conditions. Finally, the risk factors were identified and prioritized. Each step in this process is described on the following page.

**FIGURE 2** Stepwise process for identifying priority risk factors



### **Step 1:** **Identify major health conditions**

The DEAG realized that cataloging the risk factors for each of the thousands of different diseases and injuries that affect Wisconsin citizens each year was not possible given available time and resources. Therefore, it was decided to limit risk factor analysis to the certain high priority health conditions. Identification of the priority health conditions was a two-step process. The first step was to identify the major health conditions that impact Wisconsin residents; the second step was to select the highest priority health conditions for risk factor analysis.

For the purpose of this process, a health condition was defined as a disease or injury that is listed in the International Classification of Disease, 9th Edition (ICD-9). This document lists over 15,000 diagnostic codes for different diseases and injuries. To identify the major health conditions, DEAG reviewed past health plans from the federal government, Wisconsin, and other states. Input was also obtained from Chief Medical Officers in the Wisconsin Division of Public Health, local public health agencies, physicians, social scientists, health care providers and clinicians, individual DEAG members, and other

experts. This process resulted in the identification of 160 major health conditions.

### **Step 2:** **Prioritize health conditions**

Because of time and resource limitations DEAG considered that a thorough risk factor analysis was practical for only about 50 conditions. To select the health conditions for risk factor analysis DEAG needed a process to prioritize the list of 160 major health conditions. The DEAG health condition prioritization process had three components:

1. estimating the magnitude of each condition,
2. estimating the severity of each condition, and
3. identifying a method for selection of priority health conditions.

#### **MAGNITUDE ESTIMATES**

The magnitude of a health condition was defined as the number of persons in Wisconsin affected by the condition during a typical year. This includes persons with onset of a condition during a year and persons who had onset in the past but continue to be affected by the condition. Magnitude estimates included, but were not restricted to, fatal cases.

To obtain magnitude data for each of the 160 major conditions, persons with expertise in each condition were identified. These experts included Chief Medical Officers and program epidemiologists from the Wisconsin Division of Public Health, local public health officials, physicians, social scientists, clinicians, and others. Experts were asked to provide their best estimate of magnitude for conditions for which they had expertise. For some conditions state-specific data sources were available to guide estimates. In some instances estimates were extrapolated from national data. Magnitude estimates obtained from experts were used to assign a magnitude score for each condition using the ranges shown in Table 1.

TABLE 1 Categorical magnitude scoring ranges

SCORE	NUMBER AFFECTED BY CONDITION	MINIMUM PERCENT OF WISCONSIN POPULATION
1	Less than 500	0.0%
2	500–999	0.01%
3	1,000–4,999	0.02%
4	5,000–9,999	0.1%
5	10,000–24,999	0.2%
6	25,000–49,999	0.5%
7	50,000–99,999	1%
8	100,000–249,999	2%
9	250,000–499,999	5%
10	500,000 or more	10%

#### CHARACTERIZATION OF SEVERITY

The severity of conditions was estimated using an expert rating process. Over 100 expert raters were identified and were divided into 11 teams. Each team had between 8 and 11 members and was assigned between 12 and 18 conditions to rate. To estimate inter-team reliability, 2 conditions, *ischemic heart disease* and HIV infection, were assigned to all 11 teams.

Raters were asked to estimate the impact that each condition had on affected individuals and score the severity on a scale of one to ten, with ten being the most severe. Raters were provided guidelines to consider while making their determinations (Table 2). After the initial rating, the severity scores for each condition were averaged and reported back to the expert raters who were then allowed to reconsider their scores. After the reconsideration process, final average severity scores were calculated for each condition.

TABLE 2 Issues considered during the severity rating process

Potential for death
Impact on family, community and society
Impact on affected individuals usual activities
Potential for utilization of medical care
Economic burden for each case

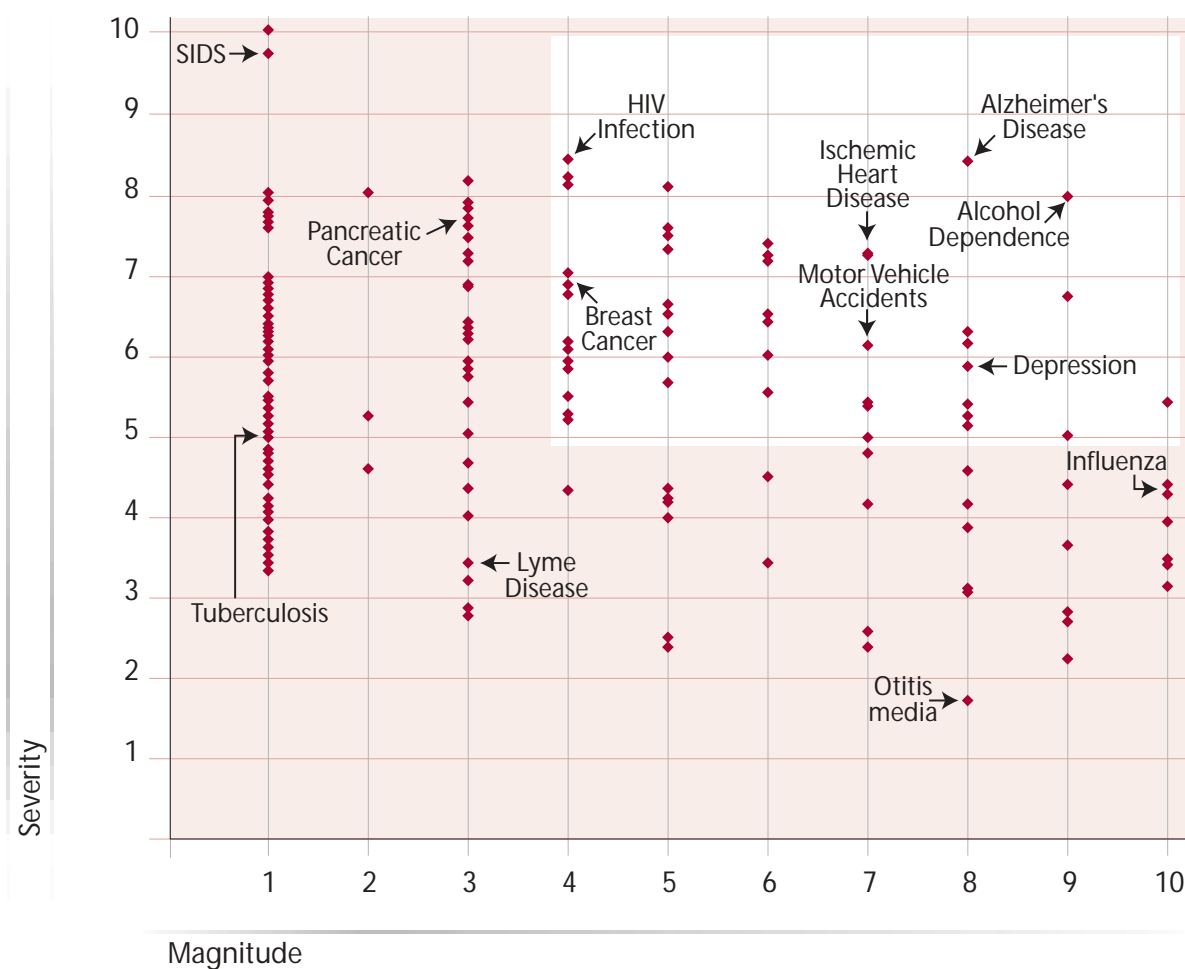
#### PRIORITIZATION OF HEALTH CONDITIONS

The rationale behind the health condition prioritization process was that a higher priority should be accorded to health conditions with high magnitude and severity than for those with lower magnitude and severity. Figure 3 graphically depicts each of the 160 major health conditions as a function of their magnitude and severity scores. Certain conditions are labeled to provide benchmarks. The highest priority conditions are in the upper right quadrant (high magnitude and high severity). For example, *Alzheimer's Disease* and alcohol dependence were judged by the expert raters to have both high magnitude and severity. In contrast, *otitis media* was judged to have a high magnitude but low severity compared to other conditions, while *Sudden Infant Death Syndrome (SIDS)* had a very high severity rating, but a low magnitude.

The selection of priority health conditions from this array was the responsibility of the Transformation Team. This was accomplished through a multistep process. First, the Transformation Team determined that health conditions with a magnitude of equal to or greater than four (representing at least 5,000 affected persons) and a severity of equal to or greater than five would be considered high priority. This region is depicted by the rectangle in Figure 3.



FIGURE 3 Adverse health conditions characterized by magnitude and severity



Second, the health conditions that fell just outside of this region were considered and added as appropriate. For example, of the several sexually transmitted diseases (*genital herpes simplex infection, chlamydia, human papillomavirus infection, and gonorrhea*), each one was of very high magnitude, but had a severity score just below the cutoff. The Transformation Team decided to collapse these conditions into a single entity (sexually transmitted disease) and include it as a priority condition.

Next, the Transformation Team reviewed age, race/ethnic and gender-specific mortality data to assure that leading causes death for

certain sub-populations were given appropriate consideration. For example, SIDS was outside of the high priority region, but was made a priority because it is a leading cause of death for infants in Wisconsin.

Finally, the Transformation Team reviewed all conditions and added priority conditions as was deemed necessary. Several priority health conditions, including adverse conditions resulting from health care, airborne infectious disease, and vector-borne infectious disease, were added to the priority list at this time. The final list of priority health conditions is shown in Table 3.

TABLE 3 Fifty-four priority health conditions

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| <ul style="list-style-type: none"> <li>• Adverse conditions resulting from health care</li> <li>• Airborne infectious disease</li> <li>• Alcohol abuse</li> <li>• Alzheimer's disease</li> <li>• Asthma</li> <li>• Autism</li> <li>• Breast cancer</li> <li>• Cerebrovascular disease</li> <li>• Chronic obstructive pulmonary disease</li> <li>• Colorectal cancer</li> <li>• Congenital anomalies</li> <li>• Congestive heart failure and other heart disease</li> <li>• Degenerative disc disease</li> <li>• Dental disease</li> <li>• Depression</li> <li>• Diabetes</li> <li>• Domestic abuse and neglect</li> <li>• Drug abuse</li> <li>• Eating disorders</li> <li>• Epilepsy</li> <li>• Farm injuries</li> <li>• Food and waterborne disease</li> <li>• Food insecurity</li> <li>• Gestational diabetes</li> <li>• Hearing impairment</li> <li>• Hepatitis B</li> <li>• Hepatitis C</li> </ul> | <ul style="list-style-type: none"> <li>• HIV infection and AIDS</li> <li>• Homicide and injuries purposely inflicted by others</li> <li>• Hypertension</li> <li>• Ischemic heart disease</li> <li>• Lead poisoning</li> <li>• Low birth weight</li> <li>• Lung cancer</li> <li>• Melanoma/Skin cancer</li> <li>• Motor vehicle accidents</li> <li>• Multiple sclerosis</li> <li>• Neonatal sepsis</li> <li>• Osteoporosis</li> <li>• Parkinson's disease</li> <li>• Pneumonia/Influenza</li> <li>• Pre-eclampsia/toxemia</li> <li>• Primary arthritis</li> <li>• Prostate cancer</li> <li>• Reactive arthritis</li> <li>• Schizophrenia and other psychoses</li> <li>• Sexual assault</li> <li>• Sexually transmitted disease</li> <li>• Sudden infant death syndrome</li> <li>• Suicide and other self-inflicted injuries</li> <li>• Teen pregnancy</li> <li>• Urinary incontinence</li> <li>• Vector-borne infectious disease</li> <li>• Workplace injuries</li> </ul> |
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### **Step 3:** **Identify risk factors**

Once the priority health conditions had been identified, the next step was to compile a risk factor profile for each condition. A preliminary list of risk factors for each condition was identified by individuals with expertise in that condition. These risk factors were then categorized into each of the four risk factor domains (non-modifiable risk factors, environmental risk factors, societal risk factors and individual risk factors) and used to populate a DEAG risk factor worksheet.

The DEAG identified 140 individuals for the risk factor expert rating process. Each rater was provided with 5 to 10 DEAG risk factor worksheets for conditions in their area of expertise. Raters were asked to first estimate the percentage of risk for that condition that could be attributed to each of the 4 risk factor domains. Next raters were asked to specify risk factors and quantify the

percent of risk attributable to each risk factors within each domain. The risk factors provided on the DEAG risk factor worksheet guided this process. However, raters were free to use or ignore these risk factors or to enter additional risk factors as they considered appropriate.

For example, for a hypothetical health condition a rater might assign 50 percent of the total risk to individual factors, 10 percent to environmental factors, 25 percent to non-modifiable factors and 15 percent to societal factors. The sum of these four domain scores was always 100 percent. Next, within the individual risk factor domain the rater might specify that smoking represented 60 percent of the risk, diet 10 percent, lack of exercise 15 percent and alcohol use 15 percent. The sum of the scores for risk factors within a domain was also always 100 percent.

DEAG scored the risk factor worksheets received from the expert raters. The score for

**TABLE 4** Fifteen top ranked risk factors

Rank	Risk factor	Summary Score
1	Genetic predisposition and family history	655.10
2	Predisposing medical conditions	415.97
3	Inadequate access to health care	340.45
4	Age	299.09
5	Tobacco use	212.78
6	Low socioeconomic status	211.07
7	Diet/nutritional factors	182.67
8	Overweight/obesity	142.54
9	Factors resulting in health disparity	135.36
10	High risk sexual behavior	127.44
11	Environmental and/or occupational hazards	116.07
12	Alcohol use/abuse	110.01
13	Gender	106.73
14	Drug use/abuse	105.99
15	Lack of social supports	92.79

each risk factor was calculated as the product of the overall domain score and the specific risk factor score within that domain times 100. For example, if a rater assigned 50 percent of total risk to the individual risk factor domain and, within that domain, 60 percent of the risk to tobacco smoking, the score for tobacco smoking for that condition would be 30 (i.e.,  $0.5 \times 0.6 \times 100 = 30$ ). Within each condition, the scores for each risk factor were averaged across all raters.

#### **Step 4:** **Prioritize risk factors**

To prioritize the risk factors, the average scores for each unique risk factor were summed across all conditions. The 273 risk factors reported by the expert raters were then ranked by this summary score. The Transformation Team reviewed the ranked risk factor list and selected the top 15 risk factors as seen in Table 4. for consideration during the health priority setting discussion.

#### **IDENTIFICATION OF HEALTH PRIORITIES**

The identification of specific health priorities

was the responsibility of the Transformation Team. The list of prioritized risk factors identified by the DEAG process was intended to inform the process of identification of health priorities. The Transformation Team discussed the prioritized risk factors and proposed eleven health priorities (Table 5). The Transformation Team did not rank the health priorities.

**TABLE 5** Turning Point health priorities

- Access to primary and preventive health services
- Adequate and appropriate nutrition
- Alcohol and other substance use and addiction
- Environmental and occupational health hazards
- Existing, emerging, and re-merging communicable diseases
- High risk sexual behavior
- Intentional and unintentional injuries and violence
- Mental health and mental disorders
- Obesity, overweight, and lack of physical activity
- Social and economic factors that influence health
- Tobacco use and exposure

The DEAG process had a strong influence on the development of the Turning Point health priorities. Five health priorities (tobacco use and exposure, adequate and appropriate nutrition, high risk sexual behavior, environmental and occupational health hazards, and access to health services) were derived directly from a restatement of DEAG-prioritized risk factors. The health priorities “obesity/overweight/lack of physical activity” and “alcohol and other substance use and addiction” were developed by combining several risk factors from the DEAG list. The health priority “social and economic factors that influence health” was in large part derived from several risk factors (low socioeconomic status, factors resulting in health disparity and lack of social supports). Three health priorities (“intentional and unintentional injuries and violence,” “existing, emerging and re-emerging communicable diseases,” and “mental health and mental disorders” were added as health priorities by the Transformation Team. While these were not directly derived from the priority risk factors, they were influenced by the DEAG priority health conditions.

#### ***Access to primary and preventive health services***

Inadequate access to health care was the third-ranked risk factor identified by the DEAG process. The Transformation Team recognized that primary prevention activities delivered through the health care system play a role in preventing the occurrence of disease and injury. In addition, the early identification and treatment of diseases most often occurs within the health care system. Early identification and treatment is important to minimize the adverse effects of a large number of serious health problems.

#### ***Adequate and appropriate nutrition***

The DEAG process identified diet and nutritional factors as risk factors for many major adverse health conditions effecting people in Wisconsin. This health priority encompasses malnutrition and hunger, diets deficient in vitamins and other nutrients, as well as diets that are risk factors for cancer, cardiovascular disease and other diseases.

#### ***Alcohol and other substance use and addiction***

The DEAG process identified drug and alcohol abuse as major health conditions effecting the Wisconsin population. In addition, drug and alcohol use and abuse are themselves risk factors for a wide variety of adverse health outcomes, including sexually transmitted disease and low birth weight, motor vehicle and workplace accidents, suicide and homicide, and many others.

#### ***Environmental and occupational health hazards***

Exposure to harmful substances in the physical environment is linked to many major adverse health outcomes. Next to tobacco smoke, environmental exposure to radon gas is the leading cause of lung cancer. Asthma and other respiratory diseases are associated with poor air quality. Exposure to solar ultraviolet radiation is a risk factor for skin cancer. Water and food contaminated with pathogenic microorganisms or toxic substances are significant causes of disease.

#### ***Existing, emerging and re-emerging communicable diseases***

The Transformation Team recognized that although many communicable diseases common in the past are now rare, it is necessary to maintain current efforts to prevent their re-emergence. In addition, in the recent past, rare or previously unrecognized diseases, including HIV infection, *cryptosporidiosis*, and others, emerged as significant health problems within Wisconsin. Other communicable diseases are likely to emerge in the future.

#### ***High risk sexual behavior***

High risk sexual behavior is a risk factor for teen pregnancy and for sexually transmitted diseases, including HIV infection and AIDS. Sexually transmitted diseases are extremely common among adolescents and young adults and HIV infection is a leading cause of death for persons 25-44 years of age. Sexually transmitted diseases contribute to infertility and human *papillomavirus* infection is a leading cause of cervical cancer.

***Intentional and unintentional injuries and violence***

Intentional injuries include injuries inflicted by others (homicide, sexual and other assaults, and others), and self-inflicted injuries (suicide and non-fatal self-inflicted injuries). Unintentional or accidental injuries are a major cause of death and disability in Wisconsin. These injuries result from many causes including motor vehicle accidents, farm and other workplace accidents, accidents in the home, and others.

***Mental health and mental disorders***

Mental disorders including *Alzheimer's Disease, depression, eating disorders, schizophrenia and other psychoses* were identified as priority health conditions by the DEAG process. The Transformation Team recognized that mental disorders affect large numbers of persons each year in Wisconsin. Mental disorders also place individuals at risk for many other adverse health outcomes, including alcohol and drug abuse, accidents, suicide and others.

***Obesity, overweight, and lack of physical activity***

The Transformation Team combined these inter-related factors into a single health priority. These factors play an important contributory role in *heart disease, hypertension, diabetes* and other diseases that are major causes of death and disability in Wisconsin.

***Social and economic factors that influence health***

The Transformation Team recognized that there is an association between social and economic factors and adverse health outcome. Low socioeconomic status including poverty, lack of educational attainment, and other factors was the sixth leading risk factors identified through the DEAG process. In addition, the DEAG process also highlighted the association between poor health outcomes and social factors, such as discrimination, which often result in health disparities.

***Tobacco use and exposure***

The relationship of tobacco use and many diseases is well established. The DEAG process identified tobacco use as a risk factor for a significant number of major health conditions, including *lung and other cancers, heart disease, cerebrovascular disease, respiratory diseases*, and others. The Transformation Team recognized the effects of tobacco and second-hand smoke on both smokers and on non-smokers