

GUIDE TO HEALTH SCREENING IN THE WORKPLACE



Office of the Chief Medical Officer

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This document gives guidelines to government departments and employers on sourcing health screening from commercial providers.





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Introduction

The Chief Medical Officer's Office (CMO) frequently receives queries from Departments or Offices who are planning to offer health screening programmes to employees. Management are often offered what seems like a bewildering array of tests, procedures and questionnaires by outside commercial providers, and are often unsure of the best way to proceed. The purpose of these guidelines is to help management decide what tests to offer to employees, and what steps need to be put in place to ensure health screening programmes are run properly.

Health screening generally takes two forms. The first of these is laboratory test screening (e.g. Cholesterol measurement). The purpose of this is to detect an abnormality with a view to making an intervention before any illness develops. For example, a raised cholesterol can be treated with drug therapy in order to reduce the risk of a future heart attack. The second kind of screening offered by companies is lifestyle questionnaires. These ask clients about lifestyle factors, such as smoking, alcohol consumption, diet etc. with a view to modifying these lifestyle factors in order to prevent the future development of illnesses.

Workplace health screening should not be confused with statutory workplace health surveillance such as audiology screening for noise exposure in the workplace, or random population screening for public health purposes.

Government Departments and Offices offer health screening to employees both to help improve their overall health and wellbeing, and also to show that their employer is interested and concerned about their welfare. Whilst the latter may seem like a "soft" reason to offer health screening, it is a perfectly legitimate and reasonable motivation.

Whilst there are no real contentious issues or problems around lifestyle questionnaires, there are difficulties and potential pitfalls around laboratory test screening, such as false positive results and false negative results. These can result in expensive and time consuming follow on tests, and may cause anxiety to individuals. They may also lead to complications if an individual is subsequently seeking life assurance or medical incapacity insurance.

Workplace health screening can be divided into three categories, namely tests that are known to be beneficial, tests that may be beneficial, and tests that are of uncertain benefit. These guidelines seek to categorise laboratory tests into these three different categories. There is also a fourth category of test that is probably best offered by the individual's GP rather than in the workplace. This mainly refers to breast and cervical cancer screening.

The guidelines also detail what questions Departments/Offices should ask of commercial health screening providers, and the steps that should be put in place to ensure that



programmes are conducted in a safe and effective manner.

I hope these guidelines are of help in deciding what health screening you should consider offering to your employees. Whilst this document is aimed at government departments and offices, it may also be of value to other organisations considering workplace health screening programmes.

Finally, I would like to thank Ms Bernadette Lavelle, Occupational Health Nurse for her assistance in drafting this document.

Dr. Tom O'Connell
Chief Medical Officer



Executive Summary

The purpose of this document is to give guidance to government departments and employers who are sourcing workplace health screening from outside commercial providers. The CMO's Office is frequently asked for an opinion on the various health screening tests provided by companies. Details of what questions Departments/Offices should ask of commercial health screening providers and the steps that should be put in place to ensure that programmes are conducted in a safe and effective manner are also included.

Health screening in the workplace is very different from attending a health professional for treatment when ill. Its aim is to detect non-symptomatic disease or alternatively lifestyle risk factors that may lead to disease.

Health screening can involve blood/laboratory tests and/or lifestyle questionnaires. The purpose of the blood tests is to detect a non-symptomatic abnormality such as raised cholesterol before it causes an illness like a heart attack or stroke. The purpose of the lifestyle questionnaire is to detect some adverse lifestyle factor such as smoking before it causes disease or illness such as lung cancer.

In relation to blood and laboratory tests, the World Health Organisation (WHO) does not recommend carrying these out unless the disease being screened for

- Is a common health problem
- Is a serious health problem
- Has effective treatment available
- Has screening test procedures which are acceptable, safe, accurate and relatively inexpensive
- Early intervention has been shown to have a positive effect on eventual outcomes.

Lifestyle health screening typically involves the completion of a health questionnaire to include past and current history of illness, family history of various diseases, lifestyle habits and activities such as smoking, diet/nutrition, exercise, alcohol consumption, and mental health status examination. Completed questionnaires are analysed by the health professional and questions are explored and discussed with the participant on interview. Any risks or problems identified are explained and advice is given on how to change lifestyle to improve health and wellbeing.

Usually a combination of both laboratory tests and lifestyle analysis is used to give a complete picture of the participant's health. The results of the tests are given by a medical professional typically 1 – 2 weeks following the tests and the participant is invited to discuss these at an arranged appointment. All abnormal results should be referred for further investigation to the individual's general practitioner (GP).



The more tests carried out does not necessarily mean more benefits to the client. Excessive testing can even have adverse outcomes. This is the key message of these guidelines.

Laboratory tests and procedures for asymptomatic workers can be divided into three broad categories namely tests that are beneficial, tests that are possibly of benefit, and tests that have not been shown to be of benefit. There is also an additional category of tests that are best provided by General Practitioners or National Screening Programmes, for quality assurance reasons.

Tests that are commonly offered by providers are categorized in the table below. We advise that all of the tests in the beneficial category should be offered to employees, and that some or all of the tests in the possibly beneficial category should be offered to employees.

Beneficial	Possibly Beneficial	Not of Proven Benefit	Best provided by GP
Height Weight Body mass index Blood pressure Glucose Cholesterol	Full blood count Urea and electrolyte Liver function test Lung Function Tests Thyroid function test Urinalysis	Electrocardiograph Bone density Prostate specific antigen Food Intolerance Tests	Breast Screening Cervical Screening

We are not advocating the use of tests that have not yet been proven to be of benefit in the random health screening of individuals without symptoms or specific risk factors.

In terms of lifestyle questionnaires the CMO's Office has no specific recommendation except that they should include questions on smoking, diet and exercise.

When setting up a health screening programme through a commercial provider, it is important that the following steps are followed to ensure that the screening is conducted to a high standard-

- Indemnity for the Department against any mistakes or errors
- Programme should be overseen by a medical doctor
- Results should be given by a health professional
- Provide a report/evaluation of the programme to the department
- Clarify arrangements for follow up of abnormal results that require further investigation with employee's own GP



SECTION 1

1. Health screening

Health screening is described as the encouragement of a person to present for assessment in order to detect disease or risk factor which is currently not producing symptoms. The aim is to intervene early so that either further progression can be stopped or that the eventual outcome can be improved.

1.1 Types of health screening

- Laboratory tests measure a parameter such as blood cholesterol or blood glucose. If this parameter is outside its expected normal range, it may indicate an increased risk of developing future illness (eg raised cholesterol and heart disease) or else the presence of an illness that is not yet producing symptoms (eg raised glucose and diabetes).
- Lifestyle screening uses a questionnaire filled in by the client to identify lifestyle factors such as smoking which may affect health. Education and information by way of leaflets and advice on the various factors identified such as smoking, diet etc are given to the client with the aim of a change or modification of lifestyle to improve health.
- A combination of both is the usual type of screening, offered by private commercial suppliers.

1.2 Criteria for health screening

The World Health Organisation's suggested criteria for health screening are that the disease being screened for

- Is a common health problem
- Is a serious health problem
- Has effective treatment available which can reduce disability and mortality
- Has test procedures which are acceptable, safe, accurate and relatively inexpensive
- Has a long pre-clinical or asymptomatic phase
- Early intervention has been shown to make a difference to eventual outcomes.



1.3 Advantages

At present only a limited number of health screening tests have been shown to be of definite benefit. It certainly makes good sense to check blood pressure because high blood pressure may not have any symptoms. An elevated blood cholesterol or an elevated blood glucose due to diabetes are common conditions in the Irish population, and early intervention is known to be beneficial.

The benefits to the organisation are varied and are often sold as a healthier, fitter workforce with reduced levels of sickness absence, improved employee effectiveness and increased productivity. Whilst this may be the case, there is no hard evidence to support this. However, an appreciation by staff that the organisation cares about their welfare certainly fosters employee commitment and work satisfaction.

1.4 Disadvantages

Evidence suggests that health screening that does not meet World Health Organisation criteria may be of doubtful value. It should also be borne in mind that health screening can generate anxiety in people who previously felt well. Unnecessary screening may lead to further follow up confirmatory tests that may be expensive and unpleasant and may end up indicating no abnormality.

An abnormal screening test result that is not fully investigated or followed up may affect an individual's entitlement to future Life Assurance/Critical Illness Cover etc. causing stress, anxiety and financial loss.

1.5 Who can carry out workplace health screening?

There are five or more companies in Ireland who carry out health screening in the workplace and include many or all of the tests which will be described. The Civil Service Occupational Health Department can provide details of these providers, although we do not endorse any particular company over another.



SECTION 2

2. Tests

A variety of tests can identify diseases which respond to treatment. Many conditions can be corrected or improved through a simple course of treatment once they have been discovered. Blood tests can identify diseases such as diabetes. Blood pressure and weight measurements can also identify health risks that can lead to future illness (e.g. heart disease). The results are compared to recommended readings for the tests for age etc of the client. Abnormal readings are referred on to the client's GP for further investigation and follow up.

The tests described here are the most commonly used for health screening. We have categorised these tests into beneficial, possibly beneficial, not of proven benefit and best provided by GP. We advise that all of the tests in the beneficial category should be offered to employees, and that some or all of the tests in the possibly beneficial category should be offered to employees. We advise against offering tests that are not of proven benefit or that are best done by a General Practitioner.

2.1 Blood Pressure Test (Beneficial) - This is a measure of the pressure of the blood against the blood vessel walls. It rises and falls during the day. It is usually written as one number over another for example 130/80. Normal blood pressure ranges from 120/60 – 140/80 mm Hg. The top number (systolic) measures the pressure when the heart contracts. The bottom number (diastolic) measures the pressure when the heart relaxes. If blood pressure remains elevated for a time it is called hypertension or high blood pressure. Both numbers in a blood pressure test are important, but for people over 50 years of age, the systolic pressure gives the most accurate diagnosis of high blood pressure. The diastolic blood pressure has been and remains, especially for younger people, an important measurement as well.

Treating high blood pressure can save lives. If left uncontrolled it can lead to stroke, heart attack, congestive heart failure, kidney damage, blindness and or other conditions.

2.2 Cholesterol (Beneficial) Cholesterol is a fat-like substance found in the bloodstream and in all body cells producing cell membranes. Too high a level of cholesterol in the blood is a major risk for coronary heart disease, heart attack and stroke. Hypercholesterolemia is the term for high levels of blood cholesterol. Cholesterol is made in the body and also comes from cholesterol in animal products such as meats, poultry, fish, eggs, butter, cheese and whole milk. Food from plants like fruits, vegetables and cereals do not have cholesterol. Cholesterol and other fats cannot dissolve in the blood. They are transported to and from the cells by carriers called lipoproteins. There are two kinds - low-density lipoprotein (LDL) is known as the “bad” cholesterol and high-density lipoprotein (HDL) is known as the “good”



cholesterol. Too much LDL can slowly build up in the inner walls of the arteries that feed the heart and brain and cause heart disease or stroke. HDL carries cholesterol away from the arteries and back to the liver, where it is passed from the body. A high reading on this test needs further investigation following 12 hours of fasting.

2.3 Triglyceride (Beneficial) - Triglyceride is a form of fat that comes from food and is also made or synthesised in the body. Triglycerides are synthesised in the adipose (fat) tissues and the liver and are stored in the fatty tissues of the body as energy reserves. People with high triglycerides often have high total cholesterol for example high LDL cholesterol and a low HDL cholesterol level. High triglyceride levels are a risk factor for heart disease, diabetes and obesity. High levels are referred to the GP for further investigation and treatment as necessary.

2.4 Body mass index or BMI (Beneficial) – This is a calculation that interprets body weight for individual differences in stature (weight in kg ÷ height in m²) and correlates this index to mortality ratios. BMI is recognised as a valid assessment tool in identifying obesity. Obesity is the medical term used to describe the state of being overweight to the point where it is harmful to health and is associated with increased morbidity and mortality. A BMI which is <18.5 kg/m² and >30 kg/m² is considered a risk to health. There are many health benefits to maintaining a healthy weight. Obesity increases the risk of developing medical problems such as high blood pressure, diabetes and gall bladder disease.

2.5 Electrocardiogram (Not of Proven Benefit) – An electrocardiograph (ECG) is a resting test of the heart to record the electrical activity in order to detect any underlying heart conditions. The test is usually performed for investigations of heart or chest pains. The ECG is a static picture and may not reflect underlying heart problems at a time when there are no symptoms such as a history of intermittent chest pain. Also, an ECG may be entirely normal despite the presence of an underlying cardiac condition. The reasons for this are that certain abnormalities only appear when the heart is exercised.

It is important to remember that a normal ECG does not necessarily preclude the possibility of underlying heart disease. A person who suspects heart disease or has had a heart attack may need a series of ECGs plus a variety of other cardiac investigations.

Because a stress or exercise ECG, not a resting ECG is the test of choice for detecting non-symptomatic heart disease, we do not recommend the routine use of resting ECGs in health screening of asymptomatic individuals.

2.6 Full Blood Count (Possibly Beneficial) - This is a blood test with approximately 12 different components. The main tests are red cell count to test for anaemia or haemoglobin, white cell count to test for infection and platelet count to check for clotting factors. The



results are received from the laboratory on the various tests requested and compared with the recommended results for age, gender etc. Anaemia is common in females but can be easily corrected with iron supplements.

2.7 Liver function tests (Possibly Beneficial) – The liver is located in the upper right corner of the abdomen. It can lose three-quarters of its cells before it stops functioning and it is the only body organ able to regenerate itself. It regulates most chemical levels in the blood and excretes a product called bile which is important in the digestion of fats and it helps carry away waste products from the liver. When the liver has broken down harmful substances they are excreted from the body through faeces and urine. Other functions include

- producing cholesterol and proteins to carry fats through the body
- converting excess glucose into glycogen for storage as energy
- processing haemoglobin for stores of iron
- clearing drugs and poisonous substances from the blood
- regulating blood clotting
- removing bacteria from the bloodstream

Liver function tests are a group of blood tests to assess a broad range of functions performed by the liver. The tests include measurement of

- serum bilirubin - produced by the breakdown of red blood cells and gives bile its yellow-green colour
- albumin - the major protein present within the blood. Low levels indicate liver damage such as cirrhosis or malnutrition.
- levels of certain enzymes usually found within the liver cell that leak out when the cell is damaged such as alkaline phosphatase and alanine transaminase.

The single most common cause of abnormal liver function in Ireland is excess alcohol consumption over a period of time.

2.8 Glucose Test (Beneficial) - This is a blood test to measure sugar levels in the blood. Glucose is a sugar found in carbohydrate foods. It is the main source of energy used by the body. Diabetes is a disorder of the metabolism in which sugar and starch are not properly absorbed from the blood. Insulin is a hormone made by the pancreas which controls the amount of sugar in the blood by moving it into the cells where it can be used by the body for energy. The test measures blood glucose levels at the time of testing. The test can be a finger tip test giving a rapid on the spot result. This test is not as accurate as sending a blood sample to the laboratory.

There are two types of diabetes simply called type 1 and type 2. Type 1 diabetes is usually first diagnosed in children, teenagers, or young adults but can occur at any age and occurs when the pancreas does not make insulin. The cells become starved of energy and there is an excess of glucose in the blood. People with Type 1 diabetes must have daily injections of



insulin to live. Proper diet, exercise and blood sugar monitoring is essential to manage the disease. Insulin starts to work almost immediately or within hours depending on the type of insulin taken. Following diagnosis of type 1 diabetes, the dose of insulin is usually started off low and increased to optimum levels under medical supervision.

Type 2 diabetes has a gradual onset and is therefore harder to detect. It is more common than type 1 diabetes. Some people have few early symptoms and are only diagnosed several years after the onset of the condition with some cases already having complications. Treatment will depend on the results of investigations and may be in the form of tablets. The tablets work by lowering the blood glucose by either stimulating the pancreas to produce more insulin or by helping the body to use the insulin that it does produce more effectively. Over time, persons initially controlled with tablets may eventually require insulin.

Whilst Glucose testing may not be currently recommended in random public health screening of the general population, in a workplace screening setting, where there is already an easily screened “captive” population that are already attending for a lifestyle questionnaire / blood pressure check etc, we believe the extra marginal cost of glucose testing merits its inclusion in workplace screening. Similar arguments apply to cholesterol screening as well.

2.9 Urea and Electrolytes (Possibly Beneficial) – This is a blood test to measure kidney function. The kidneys excrete urea which is important in maintaining the electrolyte balance of the body – this is the balance between chemicals such as potassium and sodium, and the acidity or alkalinity of the blood. Kidney damage affects U&E balance.

2.10 Urinalysis (Possibly Beneficial) – This is where a specimen of urine is analysed and looked at for its appearance, acidity and the presence of protein, sugar or bacteria. Urinalysis can be used as an indication of how various parts of the body, such as the kidney, are working. It is usually carried out by means of dip stick into the urine to measure the presence or absence of the above. It is a quick and inexpensive test.

2.11 Bone Density (Not of Proven Benefit) – This is the X-Ray measurement of bones to diagnose osteoporosis and the risk of bone fracture by measuring the amount of calcium in regions of the bones. Bone mineral density increases up to the age 35 and then levels off until menopause when it declines sharply (1-5%) for the first six to eight years of menopause. Bone density usually involves taking dual energy x-rays (DEXA) of bones in the spinal column, wrist, arm or leg. The patient lies fully clothed on a padded table while the system scans one or more areas of bone usually the lower spine or hip. The examination only takes a few minutes and the result is compared to “normal” for age. A radiologist interprets the results and gives a report.

Age is the strongest predictor of osteoporosis. Women aged 65 and over have a higher risk of having osteoporosis compared with women under that age. Low body weight is also associated with osteoporosis. Other risk factors for fracture or low bone density include



family history of osteoporosis, low physical activity, smoking, excessive alcohol or caffeine use, and low levels of calcium and vitamin D intake. Certain medications (e.g. some anti-epileptic medications) and intestinal malabsorption syndromes (e.g. Crohn's Disease) can also predispose individuals to osteoporosis.

At present, women with osteoporosis, should be treated by adequate calcium intake, adequate vitamin D intake, exercise and stop smoking. These recommendations apply to all post-menopausal women, whether or not they have bone density tests. In certain circumstances, individuals may need to take medications that stop further bone density loss or increase existing bone density.

There are indications for the use of osteoporosis screening in women who have specific risk factors such as low body weight, a poor dietary calcium intake, who have a family history of osteoporosis, have certain medical conditions or are on specific medications. It is also an appropriate investigation following certain kinds of bone fracture. This is probably best arranged through their General Practitioner or a hospital doctor.

However, at present, there is not a sufficient evidence base to recommend its routine use in asymptomatic women.

2.12 Cervical smear (Best Done Through GP) – This is also known as the Papanicolaou smear. The smear test looks for cervical and/or vaginal cells that pre-cancerous. A sample of cells are obtained during the test and smeared onto a slide and viewed under a microscope in the laboratory. The optimum frequency of smear testing is not fully established.

Positive tests need further investigation. This test is probably best done by the patients General Practitioner or else in a dedicated women's health clinic. This is because of the vital importance of follow-up of abnormal results, and because of the ongoing need for regular screening with appropriate call / recall mechanisms. A National Cervical Screening Programme is due to be put in place shortly by the HSE.

2.13 Prostate specific antigen (Not of Proven Benefit) – Often abbreviated to PSA, this is a blood test to measure the level of prostate specific antigen in the blood. It is usually used along with a rectal examination to diagnose prostate cancer in males. It is advocated by some authorities as a screening test for early detection of prostate cancer.

There is uncertainty around what constitutes a normal or abnormal PSA level. Various factors can cause PSA levels to fluctuate. There is uncertainty over its use in persons with no symptoms. The recommendations for screening vary among experts, some suggest yearly screening over age 50, others caution against routine screening, while others advise considering the risks and benefits on an individual basis and encourage men to make personal decisions about screening.

Positive tests need further investigations which are quite involved and include ultrasound



guided trans-rectal biopsy of the prostate gland. The British Medical Association has recently cautioned against its routine use in asymptomatic males, as two out of three males with a raised PSA will subsequently be found not to have prostate cancer. The Department of Health & Children recently launched Cancer Control Strategy does not recommend PSA screening of asymptomatic men.

A recent American study in Connecticut compared 501 men who had died of prostate cancer with 501 men who had survived prostate cancer. 14% of those who died from prostate cancer had been screened with PSA, versus 13% of those who survived. After adjustment for race and various co-existing illnesses, it was found that PSA screening had no statistically significant impact on survival rates from prostate cancer.

Thus, because of the problem of false positive results and the need for unpleasant follow on tests, the test is currently not routinely recommended in asymptomatic males. As with all screening tests, it is possible that this recommendation could change in the future in the light of new scientific evidence or an improved screening test.

2.14 Thyroid function tests (Possibly Beneficial) - These blood tests check the function of the thyroid gland. The thyroid gland produces hormones that are essential for normal body metabolism. It is situated in the lower part of the neck below the Adam's apple and wraps around the windpipe (trachea). The test measures the levels of hormones to assess thyroid function. A reduced level of the hormone thyroxine is known as hypothyroidism causing a reduced metabolic rate, weight gain, slow pulse, and general slowness. A high level of the hormone is known as hyperthyroidism. This is caused by over activity of the thyroid gland and can lead to, among other things, restlessness, nervousness and a fast pulse rate. Positive tests need further investigation and treatment by a specialist.

2.15 Pulmonary Function Tests (Not of Proven Benefit) - This is a lung/pulmonary function test to evaluate the functioning capacity of the lungs. It measures how much air the lungs can hold, the length of time it takes for air movement in and out of the lungs, and how well the lungs add oxygen to the blood and remove carbon dioxide from the blood. The test can help diagnose lung disease and measure the severity of lung problems that prevent normal breathing. Its use in asymptomatic individuals is unclear but it can be of use in encouraging smokers to quit by demonstrating that their lung function is abnormal.

Pulmonary function tests are used more in statutory workplace health surveillance in the workplace where there is dust or fume exposure than as a health screening test. Thus, we would recommend this test as an aid to smoking cessation, but not as a screening test for non-smokers.



SECTION 3

3. Lifestyle

Lifestyle screening generally consists of a questionnaire with questions on age, gender, weight, smoking, alcohol intake, family history, occupation, exercise, hobbies, activities etc to see if a person is leading a healthy lifestyle. It identifies risk factors that may cause ill health. Risk factors such as obesity, exercise or lack of it, smoking etc can be reduced following identification, information and education. A programme can be designed for the individual to incorporate into lifestyle such as diet, exercise and hobbies that are of interest to the individual etc to help him/her to make a lifestyle change and improve their health.

As previously described, health screening generally includes both a lifestyle health questionnaire followed by laboratory tests as described above. The participant is asked to complete the questionnaire before being interviewed by the nurse or doctor. On interview each question is gone through and appropriate advice is given. The various tests are then explained by the medical professional and the participant decides which tests s/he wishes to avail of.

The following sections (3.1 – 3.4) explain the rationale for Lifestyle Health Screening for smoking, exercise, diet and alcohol consumption.

3.1 Smoking

Lifetime smoking roughly doubles the risk of developing heart disease and increases the risk of developing a stroke and other diseases such as lung cancer. Smoking raises blood pressure, pulse rate and carbon monoxide in the body and reduces oxygen levels. Smoking damages cells in the lung leading to cancer and bronchitis / emphysema. It also damages the lining of the arteries causing heart disease. Smokers suffer more from cough, chest infections and shortness of breath. The arteries harden and narrow (atherosclerosis) constricting the blood flow to the brain and other vital organs. The blood platelets of smokers become thick and sticky from absorption of smoke chemicals into the blood stream making it more prone to clot and may cause deep vein thrombosis, stroke and or heart attack.

The major diseases associated with smoking are lung and heart disease and diseases of the mouth and gastro intestinal tract.

- Lung cancer - about 90% of people who develop lung cancer are smokers. Lung cancer has a poor recovery rate.



- Other lung disease - 75% of deaths from chronic bronchitis are directly related to smoking. Bronchitis occurs when the air passages produce too much mucus which cannot be removed by coughing in the usual way due to the damage caused to the lining of the passages by smoking. The mucus becomes infected and the air pockets become obstructed resulting in permanent breathing difficulties. Emphysema is an irreversible lung disease associated with chronic bronchitis. The air sacs in the lungs become enlarged and damaged reducing the lung area available for exchange of oxygen and carbon dioxide. Severe breathlessness occurs and is made worse by repeated infections.
- Heart disease - The heart beats about 70 times a minute day and night. Nicotine, when absorbed into the blood stream, leads to excessive production of adrenaline. Adrenaline constricts blood vessels and alters the blood supply to the heart itself and other vital organs. Smoking greatly increases the chance of developing cardiovascular disease and causes almost as many deaths from heart disease as from lung cancer. A smoker is 2 - 6 times more likely to suffer a heart attack than a non-smoker and the risk increases with the number of cigarettes smoked each day.
- Other illnesses/diseases - chronic sinusitis, sore throat, pharyngitis, laryngitis and bronchitis. Smoking also affects the tongue and deadens the taste buds. Hoarseness may develop and may be the first sign of malignant cancer of the mouth and throat. Cancer of the bladder and the oesophagus (gullet) is associated with smoking. The development of peptic ulcers and their poor response to treatment have also been linked to smoking.

Cigarette smoke contains up to 4,000 chemicals. Three of the main chemicals are nicotine, tar and carbon monoxide. Nicotine is the addictive substance. It is absorbed rapidly from the lungs into the blood stream. It speeds up the heart rate, causes a rise in blood pressure and can cause changes in breathing patterns. Tar is a sticky brown substance that forms when tobacco cools and condenses. This collects in the lungs and can then cause cancer. Carbon monoxide is the gas released from burning tobacco. When it is inhaled it enters the blood stream and interferes with the working of the heart and blood vessels.

Stopping smoking is often the single most effective way to reduce health risks. The lifestyle questionnaire will have questions on the client's smoking patterns and advice will be given accordingly.

3.2 Exercise

Exercise is the activity of exerting the muscles of the body in various ways to keep fit. Even in ancient times, the benefits of exercise were well known. According to Hippocrates all parts of the body, if unused and left idle, become liable to disease. On average, the risk of



developing heart disease is about a third less in people who exercise compared to those who have no exercise. Physical activity does not need to be strenuous to achieve health benefits. Men and women of all ages benefit from a moderate amount of daily physical activity such as 30 minutes of brisk walking or 15 minutes of jogging daily. Sedentary or inactive people should start with short sessions of 5-10 minutes and build up to the desired level of physical activity.

Exercise helps prevent the risk of premature death from heart disease, high blood pressure, high cholesterol, osteoporosis or thinning of the bones. It also reduces the risk of developing various forms of cancer, diabetes, over weight and obesity, depression and anxiety, and psychological problems. Physical activity improves quality of life, extends longevity, protects against the development of diseases and helps maintain full functioning and independence into old age. Health improvement through physical activity includes

- Aerobic fitness with reduced breathlessness
- A reduced tendency for blood to form clots where arteries have narrowed
- Increased elasticity in the arteries
- Exercise releases endorphins in the brain which give a 'feel good' factor.

It is not necessary to be exhausted to achieve improvement in physical fitness and it is never too late to start exercising regularly. The lifestyle questionnaire should have questions about exercise and physical fitness.

3.3 Diet/nutrition

Every day the body requires a certain amount of energy from carbohydrate, protein and fat to function properly. Because no single food provides all of the nutrients the body needs a variety of foods from the food pyramid. Eating well is not complicated but attention to recommended daily servings is important to control blood sugar and reduce the risk of diseases such as diabetes and obesity. Good nutrition increases energy levels and decreases lethargy and fatigue. Healthy eating simply means eating a wide variety of food in the correct amounts to ensure energy and vitality.

Diet components include the following

- **Carbohydrates** are contained in all sorts of bread, rice, potatoes, breakfast cereals, pasta, noodles, oats and couscous and are known as starchy foods. These are fuel foods to provide energy for physical activity and the body's day to day functions.



- **Fibre** is part of plants not digested by the body. It helps maintain a healthy digestive system and reduces cholesterol.
- **Fats** provide essential fatty acids which are vital for nerve function. Fish oils are particularly good for this. There are two types of fat - saturated and unsaturated. Saturated fats are found in most confectionery foods and in meat and dairy products. Unsaturated fat includes monounsaturated fat and polyunsaturated fats and have a beneficial effect on cholesterol levels. Fats not used up in activity will be laid down in extra fat in the body.
- **Protein** is found in meat and dairy products. Vegetarians can find proteins in nuts, beans, peas, lentils, tofu and other soya-based products. Only moderate amounts are needed to give the required protein levels.
- **Dairy produce** contain calcium for healthy teeth and bones. It is important not only for children to have enough calcium for their teeth and bones to grow, but also for adults to prevent osteoporosis in later life. Vegans or those with lactose intolerance can get the daily dose of calcium from soya milk enriched with calcium and green leafy vegetables such as spinach.
- **Water** is the most basic nutrient need. It is necessary for temperature regulation, cellular processes, and body composition.

There is no good or a bad food. The lifestyle questionnaire generally includes height, weight and BMI for the client and questions on exercise, hobbies and diet. Advice and information is given accordingly.

3.4 Alcohol

Alcohol is a depressant not a stimulant. The risks from its misuse are many and include accidents, injuries, mental impairment, overdose, relationship difficulties, addiction, financial problems and problems with the law. Different people react to alcohol in different ways and the age, gender and body weight of the individual affects the reaction.

Long term heavy drinking leads to an increase in blood pressure, heart irregularities, heart muscle disorder, stroke, certain cancers such as oesophagus, mouth, throat, larynx, colon, rectum and cirrhosis and other liver disorders. Generally, questions on alcohol consumption are included on the lifestyle questionnaire.



SECTION 4

4. Recommendations & Conclusion

At present there is only definitive evidence of benefit for a limited number of health screening tests in the workplace. It makes good sense to check body mass index, blood pressure, cholesterol and glucose as these are simple tests that detect common conditions and risk factors which can have serious consequences if not detected early. There are other tests that may be beneficial such as a full blood count, urea and electrolytes, liver function tests, thyroid function tests and urinalysis and are worth considering. Tests such as electrocardiograph (ECG), bone density, prostate specific antigen (PSA) are not recommended. Breast and cervical tests are best done by the individual's own GP.

4.1 Recommendations

Laboratory test screening can be divided into three categories e.g. known to be beneficial, may be beneficial, and have not been shown to be beneficial. There are a fourth category of tests that are best carried out by a General Practitioner.

Tests of benefit and of possible benefit are displayed in the table below

Beneficial Tests	Possibly Beneficial Tests
Height & Weight (BMI Calculation)	Full Blood Count
Blood pressure	Urea and Electrolytes
Glucose	Liver Function Tests
Cholesterol	Pulmonary or Lung Function Tests (in smokers)
	Thyroid Function Tests
	Urinalysis

We recommend offering all tests in the beneficial column, and some or all of the tests in the possibly beneficial column.



Tests not currently proven to be of benefit in random population screening of asymptomatic individuals, and thus not routinely recommended by the CMO's Office are set out in the table below

Tests not proven to be beneficial in Workplace Screening
Electrocardiograph (ECG) Bone Density Prostate Specific Antigen (PSA) Food Intolerance Tests

The individual's own GP is the best person to perform breast examination and cervical screening as s/he will follow up and monitor as required.

A copy of all test results should be given to the participant by a health professional and if necessary the person referred to his/her GP or hospital with a written report detailing the results.



The CMO's Office does not recommend any specific company to provide health screening in the workplace but it is advisable that they fulfil the criteria shown in the table below.

Criteria for Health Screening by Providers

- Confirm their medical and professional ability to provide the programme.
- The programme must be overseen by a qualified medical doctor.
- Guarantees given that any replacement personnel during the course of the project are at least of equal expertise and experience
- All test results be provided to the person by a health professional
- If results indicate further investigation the person should be referred with a written report to his/her General Practitioner (GP) or hospital.
- Provide a statistical report of the findings to the Department while respecting client confidentiality.
- Screening providers should not provide a renewal of prescriptions service as the screening doctor is not their GP and there is a danger of prescription medications being continued for excessive periods.
- Through their insurance, indemnify the Department against litigation e.g.
 - o laboratory error
 - o failure to convey the significance of results to clients
 - o failure to inform the client of relevant follow-on actions required



4.1 Conclusion

Lifestyle questionnaires cause few problems as regards health screening. However as explained, there are difficulties and potential pitfalls around laboratory test screening. In any good quality health screening programme there should be a minimum of false positive results (wrongly reported as having the condition) and false negative results (wrongly reported as not having the condition). As previously outlined, offering more tests does not necessarily mean more benefits for the employee. In fact, paradoxically, it can mean less benefits for the employee, due to excessive false positives and false negatives.

Health screening carried out for weight, blood pressure, cholesterol and/or glucose testing are of proven benefit and should form a core part of any health screening programme. Health promotion information on healthy eating, exercise and fitness can be imparted as part of the screening and encourages participants to become more active and aware of how healthy living can improve their well being.

A health screening programme should be overseen by a qualified medical practitioner, and results should be given to employees by a health professional. All abnormal results should be followed up by the participant's GP. A statistical report of the results is required to determine what health promotion initiatives are necessary and would be most beneficial to the employees. Departments/ Offices should ensure that health providers have adequate indemnity insurance to protect against laboratory errors or communication failures.





