

## **Audiometry**

### **WHAT IS AUDIOMETRY?**

This is a procedure to test hearing using a machine which produces sounds electronically. The frequency (pitch) and intensity (loudness) of each sound is varied by adjusting the machine. Hearing in each ear is measured over the full range of frequencies normally detected by the human ear. Audiometry can take up to an hour to perform depending on how many different procedures are carried out. It is done on an outpatient basis.

### **RISKS AND BENEFITS**

By detecting your ability to hear sounds of different frequencies, audiometry diagnoses the pattern of any hearing loss. It can also help predict whether you would benefit from a hearing aid and if so which type of aid would be most effective. There are no risks from the procedure.

### **WHY IS IT PERFORMED?**

Audiometry is included in the general assessment of child development as a routine screening procedure, to ensure each child has satisfactory hearing. It is also done to assess the severity of hearing loss in anyone complaining of deafness or in whom deafness is suspected, for example a child with poor speech development or an elderly person who is withdrawn or difficult to communicate with.

Audiometry helps establish the type of deafness by comparing how well you can hear sound transmitted through your ear, with sound transmitted directly to the hearing mechanism in the inner part of your ear through your skull. Some people are deaf because sound is not being transmitted properly through the ear, sometimes due to a collection of fluid in the middle ear (central part). Others are deaf because of damage to their inner ear; they have difficulty hearing sound conducted through their skull as well as through their ear.

Audiometry is also regularly carried out on people exposed to loud noise at work, for example construction workers, to ensure their hearing is not being damaged.

### **THE PROCEDURE**

No special preparation is required. Sound is transmitted through each ear canal in turn from the earpiece of a headset. The frequency of sound is increased in stages from 250 to 8000 hertz (cycles per second). At each frequency the sound is increased in intensity until you give a signal that you can hear it. A graph is then plotted showing the intensity of sound detected at each frequency, the higher the intensity required the less efficient your ear has been at hearing that sound.

This procedure is then repeated with the sound transmitted through your skull. Your ears are first blocked with earplugs and then the sound is emitted from a rubber rod, held by a headband against the bone behind each ear in turn. Rather than just rely on the patient to indicate each time the sound is heard, electrodes may be placed on the scalp to detect the changes in

electrical activity that occur in the brain in response to a sound. This is known as cortical evoked response audiometry. It is done when the deafness being assessed is due to industrial injury or if the individual is unable to respond reliably, for example an infant or someone who is mentally or physically handicapped.

If the results of your tests suggest that you are deaf because sound is unable to pass efficiently through your ear, you may have an additional procedure to determine whether your eardrum is able to move freely in response to sound. A probe is fitted into the entrance to your ear canal sealing it off from outside air pressure and sound. Air is then pumped through the probe at different pressures and at the same time a gauge on the probe registers changes in pressure within the ear canal. A graph is plotted showing the relationship between the pressure of air being pumped in and the pressure it causes in the canal. The pattern produced shows how much the eardrum can move under pressure. If the eardrum is held rigid by an effusion in your middle ear the pressure in the ear canal will rise more steeply.

### **AFTER THE PROCEDURE**

You will usually be allowed straight home. You will be given an appointment to discuss the results of these tests with your specialist, who will advise whether you need a hearing aid or surgery.