



Movement Monitors

CONI Coordinator information

Please note that families must be signposted to the manufacturer's instructions for monitor they are using – this is a quick guide for you only.

What are movement monitors?

Movement monitors sound an alarm after a pre-set time (usually 20 seconds) if they fail to detect a baby's movement. In this context they are used to detect the movement of breathing. Some monitors will alarm if the respiratory rate falls below a pre-set minimum. There are 3 main types available as medical devices:

- 1) A small sensor pad held in contact with the baby's abdomen by tape and connected by wire or tubing to the monitor e.g. SISS; Graseby MR10
- 2) A large sensor pad placed in the baby's cot, usually designed to be put on the base and under the mattress e.g. Nanny
- 3) 'Clip on' - This is a small plastic monitor that clips onto a nappy E.g. SNUZA Hero MD

In addition, there are many makes of movement monitors sold as nursery equipment to parents as 'reassurance' monitors but are not certified as medical devices.

Can movement monitors prevent sudden infant death?

Despite the widespread use by parents there is no research evidence that monitors prevent SIDS (6, 7). Babies are known to have died whilst on a monitor (8). Large scale studies looking specifically at the effect of monitor use on infant mortality rates have not been carried out. Since SIDS is relatively rare, such studies would have to involve an enormous number of babies to obtain reliable statistical information comparing babies on monitors to others at equal risk. The Confidential Enquiry into Stillbirths and Deaths in Infancy, the largest ever cot death study conducted in the UK, found that monitors a 'lack of any apparent value from such devices in the prevention of deaths. In advice published in 2016, The American Academy of Pediatrics concludes monitors should not be used as strategy to reduce the risks of SIDS (6).

Advantages of movement monitors

Many parents who have previously had a baby die as a SIDS gain reassurance using a monitor with their next baby. This is from knowing that they will be alerted should the baby stop making (breathing) movements. Parents say they are more able to sleep themselves knowing that the monitor will wake them if their baby stops (breathing) moving. Some parents bereaved by SIDS have said that if a monitor does nothing else, at least it gives them the chance to be with their baby if they stop breathing even if they cannot be resuscitated (9). Of parents using monitors provided by CONI, 91% have said the monitor was helpful or very helpful to them (10).

Disadvantages

Whilst the use of movement monitors may give considerable psychological support to some parents, there are also disadvantages:

- Movement monitors do not detect obstructive apnoea although some may alarm if movements drop below a pre-set rate per minute.

- Movement monitors can give false alarms which may heighten parents' anxiety and lead to disturbance of the baby's sleep. False alarms may occur for a variety of reasons - the sensor pad becomes detached, or the abdominal movements become so slight that they are not detected (11).
- There is a risk of babies becoming entangled with sensor leads (12)
- Parents may rely upon the monitor for assurance that the baby is well and may not look out for other signs of illness or observe the baby's overall health and development (13).
- When cessation of breathing is detected it may not be possible to resuscitate the baby.

Movement Monitor use on CONI

While recognising the limitations of movement monitors, they can have a role in increasing confidence in many bereaved parents. The Lullaby Trust recommends that when a baby is monitored:

- Parents are instructed in the use and limitations of the monitor
- Parents have a plan if the monitor alarms
- Parents are trained in resuscitation techniques e.g. basic life support (BLS)
 - The gold standard is for the health visitor to train parents in basic life support using a resuscitation doll. However, this will be a local level protocol and not always possible. It could also be achieved in other ways. For example, the local resuscitation officer could provide training to the parents, or the health visitor could sit with the parents and watch a video explaining basic life support. Organisations such as BLISS, the Red Cross and St John's Ambulance have made high-quality videos available online on YouTube or on their websites.
- The period of monitoring is discussed and date for discontinuation agreed
- Sensor-type monitors are not used after 6 months or age or when the baby can roll, reach and grasp.
- Care is taken that external movement does not interfere with the monitor e.g. movement of car or pram
- Medical back-up is easily available
- Parents and carers continue to follow the safe sleep advice

Plan if monitor alarms

It is essential that parents have a plan to follow if the monitor alarms. The following is a summary of the measures that should be considered:

1. Switch off the alarm and check baby:
 - Look to see if the baby's colour is paler than usual or blue
 - Look down for movement of the baby's chest and/or tummy
 - Place your cheek next to the baby's face to check whether you can feel or hear any breathing
 - Stimulate the baby by talking, blowing on or touching its face, tickling the soles of the feet. Do not shake the baby
2. If one of the above points applies, shout for help and carry out the basic life support techniques that you have learned. Seek medical assistance by ringing 999 as soon as possible.
3. Parents should be advised that if there is no response and they are not able to carry out BLS, then they should call for help and take the baby to the phone - dial 999 & preferably put the phone on speaker. They will then be talked through BLS.

More information is available from the Resuscitation Council (UK).

Common monitors in use

Skin contact monitors:

Graseby MR10

This Neonatal Respiration Monitor is capable of continuously monitoring the respiration of infants up to the age of 18 months and will give audio visual alarms if the infant stops breathing for more than a pre-set time. When an infant is being monitored it is essential that the user remains within visual and audible range of the monitor so that the alarms can be seen and heard. The breathing signal is picked up by a soft, foam-filled Sensor (Respiration Sensor) that is attached to the infant's abdomen. During breathing, expansion of the abdominal wall causes a small amount of air to pass through the Sensor and tube to the monitor. This

triggers an audible click and simultaneous visual indication. The monitor is powered by (AA) alkaline batteries. The Monitor does not require any routine maintenance apart from replacing the batteries and occasional cleaning. It is recommended that the performance of the monitor is checked at least annually. If the Monitor is damaged in any way the performance must always be checked before it is used again. Sensors are **single use** items, they must not be cleaned or sterilized and with regular use should be replaced after a maximum of 7 days. Never use the same Sensor with more than one infant.

SISS BABY CONTROL

The SISS BABYCONTROL is an easy-to-use device for monitoring the respiration in babies and infants. It is designed as a baby monitor, helping to prevent possible endangered babies and infants for Sudden Infant Death Syndrome or for babies and infants which are suspicious after a polysomnographic examination as well as according to a physician's diagnosis. It issues an Alarm as soon as a dangerously long interruption to respiration occurs. Respiration movements (diaphragm movements) are transformed into electrical signals by the piezo-element in the respiration sensor via compression / bending moments. The sensor sensitivity is largely determined by its location (next to the navel) and the strength of the diaphragm movement prevailing in that position. The respiratory sensor must be placed in the abdominal area of the patient in accordance with the instructions for use. It must be ensured that the detected signal is a respiratory signal. The basic requirement for this is that the sensor is fixed firmly on the skin by use of tape. Sensitive and inflamed areas of the skin should be avoided. Therefore, the use of the device may be limited for patients with sensitive skin.

The device is not suitable for:

- Monitoring premature babies with a current weight of less than 1,500 grams
- Monitoring of babies and infants who do not (yet) have independent breathing
- Monitoring of intubated babies and infants
- Postoperative monitoring of babies and infants
- Monitoring premature babies or babies in incubators when the electrical components of the incubator interfere with the functioning of the device

The alarm is triggered as soon as no pulse from the respiration sensor has been detected over the duration of the set respiration alarm time. Red LED lights and the sequence of tones are emitted for the patient alarm.

The sensor is **reusable** and should be disinfected between each baby's using the monitor. To disinfect the reusable sensor – wipe/spray the sensor with isopropyl alcohol following the disinfectant manufacturer's guidelines for relevant disinfection timescales. Then, wipe over with a soft water-moistened cloth prior to use. Do not autoclave or immerse the device or sensor in liquid.

Clean the surface of the device with a soft cloth moistened with water or a mild soap solution. If disinfecting is necessary, wipe the surfaces of the device with isopropyl alcohol (e.g. Clinell solution/wipes), then wipe over with a soft water -moistened cloth. Do not allow any liquid to enter any of the device's openings.

The monitor is powered by a single 9 V block battery. SISS BABYCONTROL monitors do not require a regular annual check.

However, the manufacturer recommends the following:

- Function test of monitors and accessories with every change of patient (referred to as a minor service)
- Monitor testing including possible updating of the internal software after 2 calendar years (referred to as a major service). Testing rigs can be purchased through the Lullaby Trust at a discounted price.

The sensor has a one-year warranty so is covered for this period for faults that are not due to misuse. The sensor if looked after well will continue to work. The expected average life time is about 2 years.

N.B. The monitors are fitted with either a 3-pole or 4-pole socket, so it is essential that the sensor being used has the same corresponding number of poles i.e. 3 or 4 so that they can be connected together.

The distribution company have produced a short user guide available for all to use via YouTube.

SNUZA Hero MD

Hero is a portable baby movement monitor which monitors a baby's abdominal (breathing) movements while sleeping. Hero can be clipped onto the baby's nappy. No cords, wires, sensor pads or external power are required. Hero detects even the slightest abdominal movement and will alert if the baby's abdominal movements are very weak or fall to less than 8 movements per minute. If no abdominal movement at all is detected for a period of 15 seconds, Hero will vibrate gently. After three vibration/rouse incidents, the Rouse Warning will alert to the fact that the baby's abdominal movements have stopped for 15 seconds on three occasions. If no further abdominal movement is detected for another 5 seconds, an alarm will sound. The monitor is powered by a battery. Clean by gently wiping with a damp cloth to remove any dirt. A mild soap may be used for stubborn dirt. Do not use any other cleaning agents as they may contain damaging chemicals. The monitor is splash resistant, not waterproof. Do not immerse in water. If it gets wet, dry it off immediately. This is supplied as **single use** monitor for a named infant. Parents will need to register www.SNUZA.com to receive updates on the usage. Parents are advised to read and follow manufacturer's instructions.

Mattress pad monitors:

BM-02 Nanny Baby Breath Monitor

The BM-02 is a certified medical device that monitors a baby's breathing movements. Its purpose is to give a visual and sound warning of any decrease in breathing movements or long pauses in breathing movements (apnoea). The device consists of a sensor pad containing a sensitive movement detector that is placed under the baby's mattress and an alarm unit. It is battery operated and runs an auto-function test upon start up. It does not affect or restrict that baby's movements. The BM-02 Nanny monitor is suitable for babies weighing from 2 kg up to 15 kg. The Monitor is powered by (AA) alkaline batteries. Other than battery replacement, the Nanny monitor does not require any special maintenance. It is recommended that the sensor pad in the cot is occasionally checked to make sure that no moisture is present where it touches the mattress. The pad should be turned 180° occasionally and aired. The pad should be cleaned with a slightly moist cloth. (Do not use aggressive detergents.) Contact with water can cause damage to the Nanny. Use antibacterial wipes for disinfecting the pad, as necessary.

The individual manufacturer's instruction booklet/manual (CONI edition) should be referred to for specific information regarding use of each type of monitor, interpreting alarm signals and technical specification information.

Other types of monitors

Respiration and oxygenation can be monitored by pulse oximeters, impedance monitors, and cardio-respiratory monitors. These are more difficult to use than movement monitors and there is no evidence that they can prevent SIDS (6).

Apnoea and ALTE or BRUE

Apnoea means that airflow into the lungs has stopped. This pause in respiration may be:

- Central - breathing movements and airflow cease
- Obstructive - the airway has become blocked (by foreign body or airway collapse) but breathing movements are present
- Mixed - a combination of the two

Irregular breathing and short apnoeic pauses are normal in young babies and usually has no adverse effects. Sometimes babies can stop breathing for a longer period and may have a change in colour, tone or consciousness. This has been called an apparent life-threatening event (ALTE) and can be very frightening to parents and other observers. In these instances, the baby may need vigorous stimulation and / or resuscitation to start normal breathing. The American Academy (AAP) has recommended that the term ALTE be replaced with Brief Resolved Unexplained Event (BRUE) (1). BRUE is limited to events in babies under 1 year old that remain unexplained after history-taking and examination. The AAP assessment protocol leads to events being categorised as lower or higher risk to help reduce unnecessary investigations and treatment. These events may be associated with an identifiable disease or condition e.g. an infection but in over 40% of ALTE no cause is found (2, 3). Some babies have been shown to be at a greater risk of sudden death (2, 4) and in the UK, 11% of SIDS babies had a history of ALTE or lifeless episode (5).

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