

## Development of MicroCT for Human Fetal Post Mortem Imaging

### Background

Following a miscarriage or stillbirth, many parents want to know why their baby died, but do not want a post-mortem that involves cutting into the body. However, if a post-mortem is not carried out, parents and clinicians miss out on valuable information about why their baby died, future pregnancies and whether future children might be at increased risk of dying. There may also be religious reasons why a post-mortem is unacceptable.

### Recent work

Our research work demonstrates that imaging can provide much of the information that a post-mortem would provide, and is acceptable to more parents. Three-dimensional imaging techniques (computed tomography (CT) and magnetic resonance imaging (MRI)) have been developed as part of a 'less invasive post-mortem', together with keyhole surgery to take samples of specific organs and provide information about the cause of death. This type of post-mortem gives the same information as a standard post-mortem for nine out of ten babies, and is more acceptable to parents than current techniques.

### Why do we need this research?

Ideally, parents would have a range of choices for the investigation after death, from less invasive techniques to the standard invasive post-mortem, and reliable information about the likelihood of getting helpful information about their baby with each option. One area where current imaging techniques are not able to give helpful information is for fetuses lost in the first part of pregnancy (between 8 – 18 weeks). This project is testing a new imaging technique that should be able to provide useful information about fetal organs in these circumstances.

### How are we going to do it?

A new imaging technique called Micro Computed Tomography (microCT) has become available which can take clear images of very small organs and body parts. This project will test how well microCT can provide useful images of tiny areas of organs in babies who have died from different medical causes, when we know our other ways of taking images do not work. MicroCT images will be compared with CT, MRI images and tissue obtained at a post-mortem, to see which method gives the most useful information. This will allow a 'how to do it' guide to be written so that other NHS centres can provide the same choice to parents.

### Why is this important for parents?

Many parents say they cannot bear the thought of their baby being 'cut open', but do not mind non-invasive tests being carried out, such as imaging and a keyhole postmortem. If the same answers can be obtained with less disturbance to the body than in a traditional post-mortem, this will be welcomed by parents.

### Why is this important to the NHS?

Parents state that they want the 'minimum necessary' disturbance to their baby's body in a post-mortem. Developing new techniques such as microCT should mean the most suitable tests for individual babies can be offered. Families will have more choice, supported by appropriate counselling, giving them the best chance of finding out why their baby has died and whether future children might be affected. If microCT is shown to be helpful in this project, it could become the

standard imaging technique offered to parents who have suffered a miscarriage, because there is no other technique that can provide this diagnostic information. This may avoid the need for standard post-mortem, change the way that pregnancy loss is dealt with in the NHS, and help counsel parents for possible future pregnancies. These are key priority areas for the NHS' "5-year forward view", and the Department of Health.