Over the last 20 years, more than 10,000 lambs have been scanned using Computed Tomography (CT).

To date, CT scans have determined the following:
- Weight of muscle in the carcase – lean weight EBV
- Weight of fat in the carcase – fat weight EBV
- Gigot muscularity – gigot EBV

These breeding values have greatly enhanced the potential for ram breeders to produce sheep with superior carcases, increasing carcase weights, conformation grades, muscle yields and reducing days to slaughter.

**New traits**

In recent years, additional measurements have been taken and through AHDB-funded research, these can now be routinely evaluated.

Table 1. New EBVs and their heritability

<table>
<thead>
<tr>
<th>Trait</th>
<th>Heritability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thoracic spine length</td>
<td>32%</td>
</tr>
<tr>
<td>Thoracic vertebra number</td>
<td>24%</td>
</tr>
<tr>
<td>Lumbar spine length</td>
<td>23%</td>
</tr>
<tr>
<td>Lumbar vertebra number</td>
<td>14%</td>
</tr>
<tr>
<td>Total spine length</td>
<td>18%</td>
</tr>
<tr>
<td>Total vertebra number</td>
<td>20%</td>
</tr>
<tr>
<td>Predicted intramuscular fat percentage</td>
<td>40%</td>
</tr>
<tr>
<td>CT eye muscle area</td>
<td>41%</td>
</tr>
</tbody>
</table>
Spinal traits
Spinal traits tend to have a low to moderate heritability, with levels of genetic variation differing between breeds. It is thought enhancing spinal characteristics could markedly increase the proportion of saleable meat in high value areas within the carcase.

Intramuscular fat percentage (IMF%)
Computed tomography predicts intramuscular fat (IMF) by measuring the density variation in different muscle and fat depots. Fat has a lower density than muscle. This variation is a good predictor of IMF level in the loin and can have an impact on meat eating quality.

While the sheep industry has made substantial progress in reducing carcase fat levels in terminal sire breeds, there is concern that breeding for increased lean growth and reduced fatness may compromise meat eating quality (eg flavour, juiciness, tenderness), partly because it is linked to IMF levels.

Work by Dr Neil Clelland and colleagues at Scotland’s Rural College (SRUC) has shown this new predictor of IMF% is heritable and expressed semi-independently of overall fatness, meaning producers could select for this trait without detriment to other breeding objectives and enhance attributes influencing meat eating quality.

Eye muscle area
For years, breeders have selected for superior muscle depth across the loin, using measurements taken by ultrasound scanning their lambs.

For various reasons, it is difficult to reliably measure muscle area across the loin using ultrasound, but an assessment can be taken of muscle depth, width and area using CT scanning.

Research has shown these measures to be highly correlated, so we know that selecting for improved eye muscle depth will increase area. However, the availability of a new EBV for CT-derived eye muscle area will assist breeders to make even faster progress in enhancing this trait.

Remember, the new carcase traits are all weight adjusted, rather than age adjusted. Therefore, the new EBV will express the amount of additional eye muscle area, relative to its weight.

Cost of CT scanning
The SRUC CT unit offers services from its Edinburgh headquarters and from locations across the UK, using a mobile CT scanner.

The cost of using the service (2018) is:

- Edinburgh £65*/head
- Mobile sites £94*/head

AHDB provides funding of £55* per lamb towards the use of the CT scanner. The net cost to English breeders using these sites is £10* and £39*, respectively. Further terms and conditions apply regarding eligible numbers and breeds.

*subject to change

Further information
If you would like to CT scan your lambs, contact CTUnit@sruc.ac.uk, Tel: 0131 535 3251.