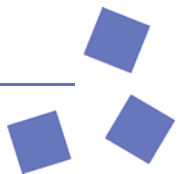




# Animal Cloning and Implications for the Food Chain

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Findings of Research Among the General Public



COI Job No: 283531

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Findings of Research Among the General Public

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Prepared for:

COI, on behalf of their client,  
The Food Standards Agency

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# 1 Executive Summary

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## 1.1 Background

Animal cloning is an emerging technology in the EU (although already more established in the US), and there is potential that, if its use becomes economically viable, food derived from cloned animals will enter the food chain across the world.

It is thought that this topic is likely to encounter a significant amount of consumer interest as the technology develops. For this reason, the Food Standards Agency commissioned research to explore initial public perceptions of animal cloning and to identify what the key issues and areas of concern/uncertainty are, particularly in relation to food.

## 1.2 Research Objectives

The overall aims of the research were to inform the development of the Agency's communication around this issue, to ensure that the consumer is fully informed of all aspects of the technology and to ensure that all areas of potential public concern are addressed when the acceptability of cloned animals for food production is being assessed in the EU and therefore becomes an issue more visible to the general public.

The research objectives addressed the following key areas:

1. Perceptions of current farming practices including breeding practices and views on cloning as an assisted reproductive technology
2. Levels of knowledge and perceived benefits of animal cloning
3. Animal welfare issues and other ethical concerns
4. Safety concerns in relation to food derived from clones and their offspring
5. Views on the need for, and nature of, regulation of animal cloning
6. Views on labelling of foodstuffs linked to cloned animals
7. Views on the role of the FSA in relation to this new technology.

## 1.3 Research Method

Given the complex nature of the topic and the evidence from previous research that public awareness and understanding of the issues are limited, a deliberative approach was adopted based on reconvened workshops, with participants taking part in two three hour sessions as well as carrying out their own background reading and research. The first workshop focused on current livestock breeding methods, an explanation of how clones are produced, how this technique can be applied to animal livestock breeding and the implications of this for the food chain. The second workshop focused on participants' views on buying and eating food derived from clones and their offspring as well as the steps they thought should be taken if such food went on sale in the UK.

Four sets of workshops were conducted, one in each of England, Scotland, Wales and Northern Ireland.

## 1.4 Key Findings

### Current Animal Livestock Breeding

- It was accepted that livestock breeders actively manage the process in order to ensure they breed from their 'best' animals. With the exception of artificial insemination, most people had not heard of the various forms of assisted reproductive technologies currently in use
- In this context, most participants felt animal cloning represents a quantum leap from 'giving mother nature a helping hand' to 'interfering with mother nature'.

## Understanding of Cloning and Perceived Benefits

- Initial levels of knowledge about, and understanding of, cloning varied widely.
- Participants struggled to identify any convincing benefits of the technique. They felt the only 'winners' were likely to be biotech companies, livestock breeders, farmers or food retailers and they were concerned that the main motive for introducing animal cloning was a pecuniary one. They questioned whether consumers would derive any tangible benefits.

## Animal Welfare and Other Ethical Issues

- As participants learned about the current low efficiency rates of the cloning method they became increasingly concerned about the implications for animal welfare. This became a significant factor behind their reluctance to accept food derived from clones and their offspring.
- The research highlighted a number of other concerns that the public are likely to voice in relation to the use of animal cloning for food production. These included concerns about where the technology might lead (in particular, to human cloning) and whether mankind has the moral right to pursue such a course.
- Underpinning many of their concerns was a lack of trust in the various players involved including biotech companies, scientists, livestock breeders, farmers, government, food manufacturers and retailers.
- If the FSA, or any other body, wishes to be a credible and reliable source of independent advice in this area, it is essential that it is seen to transcend the needs and aspirations of these different players.

## Safety Concerns in Relation to Food Derived from Clones

- Opinions were shaped by previous events especially in relation to BSE/vCJD and GM food.
- Many participants were concerned that cloning could result in food that was unsafe for human consumption. This was partly a function of the perceived high incidence of miscarriages and deformed and short-lived offspring resulting from the process. It was also because of a fear that the process of cloning might somehow create new diseases or affect the food in some way that will be harmful to humans.
- There were also concerns that cloning might impact on food quality, consistency, uniformity and price.
- There is a major mismatch between the methods used by regulatory authorities to assess food safety and the public's perception of what is needed. Participants wanted to see methods for assessing food safety that were analogous to the approach used in clinical drugs trials.
- If the efficiency of cloning can be greatly improved, this will lessen the idea that the resulting offspring may pose food safety concerns. However, unless the mismatch in perceptions about the required method of assessing food safety can be addressed, the public are likely to harbour major concerns that such food is unsafe to eat.



## The Need for Regulation of Animal Cloning

- If food derived from clones and their offspring were to go on sale in the UK, the research has provided a clear steer in terms of the steps that would help to increase consumer confidence. Irrespective of how participants felt about buying and eating such food, there was a high level of agreement about how it should be introduced and regulated. This included:
  - regulations that address the entire process from animal breeding and welfare to food production and human health, including the import and export of clones, their offspring and semen/embryos, and food derived from such
  - some form of licensing not only of the process of cloning animals but also covering how such animals enter the food chain
  - an agreed set of standards and procedures coupled with proactive monitoring and enforcement
  - traceability of clones and their offspring.
- Informing and educating the public about current regulations may help increase consumer confidence when coupled with (possibly) new controls on who can clone, how they do it and how such animals end up in the food chain.

## Views on Labelling

- There was a call for all food derived from cloned animals and their offspring to be clearly labelled - not just from a food safety perspective but to enable consumers to make an informed choice. The greatest challenge lies in working out how far removed an animal needs to be from a cloned ancestor before it is considered 'normal'.

## Role of the Food Standards Agency

- The FSA – possibly in partnership with other bodies - was seen by most as having a key role to play in the debate about food derived from clones and their offspring both in terms of setting and policing the rules as well as informing and educating the public.
- Whatever its role, it is crucial that it is perceived to be independent and trustworthy.

## Gender Differences

- There was evidence of a clear gender divide. Men often took a more rational approach, were somewhat less concerned about, and more willing to consider buying and eating, food derived from clones and their offspring. Women seemed to engage at a more emotional level, often as mothers/grandmothers, and were more worried about animal welfare and food safety. As a result, they were more likely to reject the idea of buying/eating such food. Given the fact that women tend to be the main food shoppers in many households, their views on such food are likely to have the greatest impact on any future uptake.

## 1.5 Conclusions

The key areas of concern that participants expressed are summarised below:



Based on this research, if the general public are to accept the idea of buying and eating food derived from clones and their offspring, each of these concerns would need to be addressed.

## 2 Introduction

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### 2.1 Background

Although the first cloned animal - a tadpole - was created in 1952<sup>1</sup>, animal cloning came to the public's attention in 1996 with the birth of the first mammal clone, Dolly the sheep. Since then, a number of other cloned animals have been bred including sheep, goats, cows, mice, pigs, cats, rabbits, and a gaur (an endangered species of Asian bison) and several companies are pushing to allow the commercial sale of meat and milk derived from such animals and their progeny.

In the US, the Food and Drug Administration (FDA) has concluded that *"meat and milk from cow, pig, and goat clones and the offspring of any animal clones are as safe as food we eat every day."*<sup>2</sup> The FDA has also indicated that it will not require such food products to carry any labelling informing consumers about the source of the ingredients. In the light of this, it is anticipated that US livestock producers will lift a self-imposed voluntary moratorium on the sale of food products from animal clones and their progeny. Assuming that the cloning technologies prove to be commercially viable, there is a strong probability that food derived from cloned animals will, at some point in the not too distant future, enter the food chain.

Other countries appear to be following the US lead. For example, the New Zealand Food Safety Authority, on its website, concludes:

*"There is no accepted scientific evidence to suggest that food from cloned animals is any less safe than food from non-cloned animals. On that basis, there is no need for specific regulation on such foods, should they ever enter the food chain, as they would be subject to general safety requirements under existing legislation."*<sup>3</sup>

The situation within the European Union is that there is no specific binding legislation dealing with animal cloning and only one member state, Denmark, has specific legislation on the cloning of farm animals.<sup>4</sup> The EU Novel Foods Regulation (EC25897)

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<sup>1</sup> Cited by [http://www.politics.co.uk/issue-briefs/health/medical-research/cloning/cloning-\\$366638.htm](http://www.politics.co.uk/issue-briefs/health/medical-research/cloning/cloning-$366638.htm)

<sup>2</sup> <http://www.fda.gov/cvm/cloning.htm>

<sup>3</sup> [http://www.nzfsa.govt.nz/policy-law/publications/policy-statements/food-cloned-animals/food-from-cloned-animals-final.htm#P31\\_2524](http://www.nzfsa.govt.nz/policy-law/publications/policy-statements/food-cloned-animals/food-from-cloned-animals-final.htm#P31_2524)

<sup>4</sup> Trans Atlantic Consumer Dialogue, Doc No Food-28-07, February 2007

does require that food derived from non-traditional breeding practices, such as cloning, undergo a pre-market safety assessment. This means that any food product derived from cloned animals would be subjected to a safety evaluation and would need to be approved by all European Union (EU) Member States as a novel food before it could be legally marketed.

In response to the possible commercial introduction of cloned animals into the food chain, the European Commission asked the European Food Safety Authority (EFSA) to examine the question of the safety of such food. EFSA has recently published a draft scientific opinion in which it comes to a broadly similar conclusion to the FDA:

*“Based on current knowledge there is no expectation that clones or their progeny would pose any new or additional environmental risks compared with conventionally bred animals. As with other assisted reproduction technologies, cloning could, by extensive or inappropriate use, unintentionally affect the genetic diversity by increasing the proportion of a specific genotype within a given population.”<sup>5</sup>*

Neither the FDA nor EFSA have addressed the ethics of animal cloning as this falls outside their respective terms of enquiry. Within the EU, the ethical question has been considered by the European Group on Ethics in Science and New Technologies (EGE) and they have arrived at the following conclusion:

*“Considering the current level of suffering and health problems of surrogate dams and animal clones, the EGE has doubts as to whether cloning animals for food supply is ethically justified. Whether this applies also to progeny is open to further scientific research. At present, the EGE does not see convincing arguments to justify the production of food from clones and their offspring.”<sup>6</sup>*

They go on to make a series of recommendations they believe should be followed should food products from cloned animals be introduced to the European market. These recommendations cover food safety, animal health and welfare, traceability of animals and food products and imports of clones, their offspring and materials derived from such animals. In addition, they make recommendations relating to further work on assessing

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<sup>5</sup> [http://www.efsa.europa.eu/EFSA/DocumentSet/sc\\_opinion\\_clon\\_public\\_consultation.pdf](http://www.efsa.europa.eu/EFSA/DocumentSet/sc_opinion_clon_public_consultation.pdf)

<sup>6</sup> [http://ec.europa.eu/european\\_group\\_ethics/activities/docs/opinion23\\_en.pdf](http://ec.europa.eu/european_group_ethics/activities/docs/opinion23_en.pdf)

the impact of cloning on animal welfare, for farm biodiversity and sustainability, and for labelling such foods. They also call for the public to be involved in debating the issue.

To date, most surveys of public opinion have been carried out in the USA and have uncovered considerable levels of concern and resistance both to the use of cloning *per se* and the consumption of food derived from cloned animals (see 9.6 for a summary of desk research carried out at the beginning of the project). The anticipated response of the European public has been discussed in a workshop of social science experts organised by EFSA<sup>7</sup>.

The Food Standards Agency (FSA), via the COI, commissioned Creative Research to explore public perceptions and attitudes towards animal cloning and its use in food production in the UK.

## 2.2 Aims and Objectives

The overall aims of the research were to inform the development of the FSA's communication surrounding this issue, to ensure that the consumer is fully informed of all relevant aspects of the technology and to ensure that all areas of potential public concern are addressed when the acceptability of cloned animals for food production is being assessed in the EU and therefore becomes an issue more visible to the general public. The findings will enable the Agency to better reflect UK consumer concerns when entering EU level discussions on the issue.

The research objectives were to explore:

- spontaneous reactions to the topic
- perceptions and understanding of current farming practices (including current breeding practices etc.)
- understanding of what cloning is. Do people actually know what a clone is? If they did, would this be reassuring?
- perceived benefits of the technology

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<sup>7</sup> Gaskell et al (2007) *Consumer perceptions of food products from cloned animals: A social scientific perspective*. [http://www.efsa.europa.eu/EFSA/DocumentSet/sh\\_report\\_cloning\\_gaskell.pdf](http://www.efsa.europa.eu/EFSA/DocumentSet/sh_report_cloning_gaskell.pdf)

- animal welfare issues and other ethical concerns
- the safety concerns people have about cloned animals, or their offspring, or products (meat and dairy) from cloned animals entering the food chain. What reassurances will consumers be looking for?
- views of the role of the Food Standards Agency in relation to this new technology
- views on the need for, and nature of, regulation of animal cloning
- views on the labelling of foodstuffs linked to cloned animals
- how reactions and opinions change as consumers become more informed about cloning and are provided with answers to the questions they raise.

### 2.3 Research Method: Reconvened Workshops

Given the complex nature of the subject matter and the likelihood that most members of the public know relatively little about the issues, a deliberative approach was considered to be the most appropriate method. This entails sharing information and ideas with participants in a way that encourages them to form and develop their own views. With this in mind, participants took part in two 3 hour workshops during which they were presented with information and given the opportunity to discuss and debate what they were told in a mix of break-out and plenary sessions. Between the two workshops, they were given a series of fact sheets to take away and read and encouraged to carry out their own research and to discuss the issues raised with family and friends.

The first workshop focused mainly on immediate top-of-mind associations to ‘animal cloning’, current animal livestock breeding methods (as a context), defining what is meant by a clone and outlining the technique of Somatic Cell Nuclear Transfer. The way this technique could be applied to animal livestock breeding was outlined along with the possible implications for the human food chain (see 9.1.1. and 9.3.1. for a copy of the presentation and the discussion guide used in the first workshop).

The second workshop focused on participants’ views on buying and eating food derived from clones and their offspring. Participants were divided into smaller groups based on their willingness (or otherwise) to buy and eat such food. Each group debated the reasons for their views and presented these back to everyone else. Participants were

then asked to imagine a situation where it had been decided that such food was safe to eat and that it was on sale within the UK. Staying within their groups (i.e. based on their views as to whether they would or would not buy and eat such food), participants were asked to consider three things:

1. should there be regulations and controls in place with respect to such food and, if so, what form should these take?
2. what steps could or should be taken to allow consumers to make an informed choice about the food they buy and eat?
3. what should the FSA's role be with respect to food derived from clones and their offspring?

Once more, each group debated and discussed their views and then made a presentation back to everyone else. (See 9.1.2. and 9.3.2. for a copy of the presentation and the discussion guide used in the second workshop).

In addition to the group work, each participant was given a short questionnaire to complete at the beginning and end of each workshop (four in total). In this way, any changes in their views as the work progressed were tracked (see 9.2.).

Representatives from both the FSA and the COI attended the workshops primarily as observers. At each workshop, at least one representative of the FSA was there to answer questions that participants might have either during plenary sessions or while participants were working in their breakout groups.

## 2.4 Sample

A total of four pairs of workshops took place, one each in England, Northern Ireland, Scotland and Wales. 17 or 18 people took part in each workshop; 70 participants in total. Within the confines of such a small number, the sample was structured to be broadly representative of the general population in terms of gender, age, SEG, and life-stage. Questions were included to ensure there was a spread in terms of people's media consumption and to rule out anyone who had no interest in current affairs. A quota was set on the number buying mainly organic and 'freedom foods' to ensure that the sample was as broad as possible. For similar reasons, quotas were also set on the

number of vegetarians (1 or 2 per workshop) and vegans were excluded (as the issues were not considered to be of direct relevance to them).

Those with extreme views on animal welfare and GM food and those whose work might give them a more informed perspective were screened out at recruitment as it was felt they would approach the topic with a particular agenda in mind (and would be better consulted in a different way). This included those working in biotechnology, animal welfare, farming or food production. Further details of the recruitment procedures are provided in the appendix (see 9.4).

As well as visiting each of the four nations, the locations for the research were chosen to reflect the following differences:

**Metropolitan:** Croydon, England

**Rural:** Aberystwyth, Wales

**Urban:** Aberdeen, Scotland

**Mixed:** outskirts of Belfast, N Ireland

The fieldwork was carried out between late November 2007 and early February 2008 as detailed below.

Location	First Workshop	Second Workshop
Croydon	29 <sup>th</sup> November 2007	6 <sup>th</sup> December 2007
Aberystwyth	16 <sup>th</sup> January 2008	23 <sup>rd</sup> January 2008
Belfast	17 <sup>th</sup> January 2008	24 <sup>th</sup> January 2008
Aberdeen	30 <sup>th</sup> January 2008	6 <sup>th</sup> February 2008

The Croydon workshops were carried out in advance of the other locations. Some changes to the stimulus material and the way the breakout group activities were handled were introduced in the light of this experience (for example, the explanation of SCNT was simplified and a copy of the “Peas in a Pod” BBC radio documentary on CD was added to the information pack<sup>8</sup>).

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<sup>8</sup> <http://www.bbc.co.uk/radio4/science/peasinapod.shtml>

## 2.5 Developing the Stimulus Material

The stimulus material provided for participants consisted of a series of fact sheets on key topics along with two PowerPoint presentations that were used during the course of the workshops. These materials were developed jointly by Creative Research and colleagues from the FSA. Drafts were circulated to key individuals within the FSA, COI and, where relevant, to DEFRA. These were then redrafted in the light of feedback. Copies of the stimulus material can be found in the appendix (see 9.1 and 9.5.)

## 2.6 Structure of the Report

The conclusions of the research are set out in Section 3. Recommendations have not put forward because the research was primarily exploratory and fact-finding in nature.

By way of a context for the wider discussion, participants' perceptions of a typical British animal livestock farm, and the breeding methods currently in use, were explored. The key findings are set out in Section 4.

During the course of the workshops, participants' levels of knowledge of, and concern over, animal cloning were tracked and these are reported in Section 5.

At various points throughout the process, participants' concerns and reactions to the idea of animal cloning, and the implications of clones and their offspring entering the food chain, were recorded. 16 interrelated themes have been identified which are described in some detail in Section 6.

The extent to which participants would be willing to buy and consume food derived from clones and the offspring of clones, along with their reasons, are presented in Section 7.

Finally, participants were asked to imagine a scenario where clones and their offspring were allowed into the food chain. They were encouraged to debate how this should be done, including what controls and regulations might be needed, what could be done to ensure consumer choice and what role the FSA should play. Their views are set out in Section 7.

Wherever possible, verbatim quotes have been used to illustrate participants' views. Where a quote includes comments from two or more participants, this is indicated by the use of ... at the end of one person's comment and at the start of the next person's



comment which begins on a new line. Comments made by the moderators are given in bold. Some minor editing has been carried out to ensure quotes make sense. Each quote is attributed in terms of the location of the workshop and whether it is taken from the first or second workshop.

## 3 Conclusions

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### 3.1 Current Animal Livestock Breeding

It was recognised that farms are run as businesses which increasingly involve intensive farming techniques that many people find objectionable.

It was accepted that livestock breeders actively manage the process in order to ensure they breed from their 'best' animals. Everyone had heard of Artificial Insemination; although most lacked any detailed knowledge, it was widely considered an acceptable practice. Most people had not heard of other Assisted Reproductive Technologies (ARTs), such as embryo transfer.

When set in the context of other reproductive techniques, animal cloning received negative reactions. Not only was it associated with intensive farming practices, most participants felt animal cloning represented a quantum leap from 'giving mother nature a helping hand' to 'interfering with mother nature'.

### 3.2 Understanding of Cloning and Perceived Benefits

Initial levels of knowledge about, and understanding of, cloning varied widely among participants although by the end of the research, most felt they had gained a considerable amount of knowledge.

It was noticeable that their focus was less on 'how does it work?' and mainly on 'why is it being used?' and 'what are the consequences?'

Participants struggled to identify any convincing benefits of the technique in the context of animal livestock breeding and food. They felt the only 'winners' were likely to be biotech companies, livestock breeders, farmers or food retailers and they were concerned that the main motive for introducing animal cloning was a pecuniary one. They questioned whether consumers would derive any tangible benefits.

If public concerns about animal cloning as a method of livestock breeding are to be addressed, the advantages it offers over other methods of breeding need to be communicated and consumers need to know that there are real, worthwhile benefits beyond increasing the profit margins of biotech companies and/or livestock breeders.

### 3.3 Animal Welfare and Other Ethical Issues

The public is already concerned about the impact of intensive farming practices on animal welfare; as participants learned about the current low efficiency rates of SCNT they became increasingly concerned about the impact the technique might have on animal welfare. This became a significant factor in their reluctance to accept food derived from clones and their offspring.

The research highlighted a number of other concerns that the public are likely to voice in relation to the use of animal cloning for food production. These included concerns about where the technology might lead (in particular, whether it will lead to human cloning) and whether mankind has the moral right to pursue such a course.

Many participants felt that animal cloning was being rushed in regardless and felt unable to influence events.

Underpinning many of their concerns was a lack of trust in the various players involved including biotech companies, scientists, livestock breeders, farmers, government, food manufacturers and retailers.

The research suggests that if the FSA, or any other body, wishes to be a credible and reliable source of independent advice in this area, it is essential that it is seen to transcend the needs and aspirations of these different players.

### 3.4 Safety Concerns in Relation to Food Derived from Clones

Opinions were shaped by previous events especially in relation to BSE/vCJD and GM food.

Many participants were concerned that cloning could result in food that was unsafe for human consumption. This was partly a function of the perceived high incidence of miscarriages and deformed and short-lived offspring resulting from the process. It was also because of a fear that the process of cloning might somehow create new diseases or affect the food in a way that would be harmful to humans. Moreover, the negative impact on human health and wellbeing may only become apparent at some point in the future.

There were also concerns that cloning might impact on food quality, consistency, uniformity and price.

There was a major mismatch between the methods used by regulatory authorities to assess food safety and the public's perception of what is needed. Participants wished to see methods for assessing food safety that were analogous to the approach used in clinical drugs trials.

If the efficiency of cloning can be greatly improved, this will lessen the idea that the resulting offspring may pose food safety concerns. However, unless the mismatch in methods of assessing food safety can be addressed, the public are likely to harbour major concerns that such food is unsafe to eat.

### 3.5 The Need for Regulation of Animal Cloning

If food derived from clones and their offspring were to go on sale in the UK, the research has provided a clear steer in terms of the steps that would help to increase consumer confidence. Irrespective of how participants felt about buying and eating such food, there was a high level of agreement about how it should be introduced and regulated. This included:

- regulations that address the entire process from animal breeding and welfare to food production and human health, including the import and export of clones, their offspring and semen/embryos, and food derived from these
- some form of licensing not only of the process of cloning animals but also covering how such animals enter the food chain
- an agreed set of standards and procedures coupled with proactive monitoring and enforcement
- traceability of clones and their offspring
- transparency
- a continuing programme of independent research.

Although there was universal agreement that regulation is needed, without knowing what regulations are currently in place, it is difficult for the public to suggest the form these should take or what might be proportionate. In this context, informing and

educating the public about current regulations may help increase consumer confidence when coupled with (possibly) new controls on who can clone, how they do it and how such animals end up in the food chain<sup>9</sup>.

### 3.6 Views on Labelling

There was a call for all food derived from cloned animals and their offspring to be clearly labelled - not just from a food safety perspective but to enable consumers to make an informed choice. While separation of food poses some challenges, these have been addressed in the past e.g. organic milk. The greatest challenge lies in working out how far removed an animal needs to be from a cloned ancestor before it is considered 'normal'.

Labelling is only part of the answer and participants expected that there would be a programme of public information and education.

It was also suggested that a staged introduction would be one way of helping the public get used to the idea of such food.

### 3.7 Role of the Food Standards Agency

Although the public do not fully appreciate its role or how it works, nevertheless, the FSA – possibly in partnership with other bodies - was seen by most as having a key role to play in the debate about food derived from clones and their offspring. A number of participants felt that this is such an important issue that it needs a new and dedicated body to look after it.

The FSA was seen as potentially taking responsibility for both setting and policing the rules as well as informing and educating the public.

Whatever its role, it is crucial that it is perceived to be independent and trustworthy.

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<sup>9</sup> Participants' knowledge of the detail of current regulations and controls relating to animal welfare and how animals enter the human food chain was not explored; however, with the benefit of hindsight, this would have proved a useful exercise. (Participants were provided with a fact sheet on this however; see 9.5.7).

### 3.8 Clones vs. Offspring of Clones

The extent to which participants differentiated between clones themselves and the offspring of clones entering the food chain was often unclear. This was partly because the subject matter was new, complex and controversial and also because participants did not draw such a distinction; it appeared that they would feel as uncomfortable buying and consuming food derived from the offspring of clones as they would about food derived directly from clones. Thus, when it came down to the labelling of such food, everyone wanted the labelling requirements to extend beyond food derived directly from clones to include their offspring. At the same time, even after prompting by the moderators, they could not decide how far removed an animal needed to be from a cloned ancestor before labelling would no longer be required.

### 3.9 Gender Differences

There was evidence of a gender divide. Men often seemed to take a more rational approach, were somewhat less concerned about, and more willing to consider buying and eating, such food. Women seemed to engage at a more emotional level, often as mothers/grandmothers, and were more worried about animal welfare and food safety. As a result, they were more likely to reject the idea of buying/eating such food. Given the fact that women tend to be the main food shoppers in many households, their views on such food are likely to have the greatest impact on any future uptake.

### 3.10 How Reactions and Opinions Changed as Knowledge Increased

The research has shown that as participants' knowledge increased, so did their levels of concern. This was a consequence of the various factors and themes described in Section 6 of this report.

The key areas of concern that participants expressed are summarised below:



Based on this research, if the general public are to accept the idea of buying and eating food derived from clones and their offspring, each of these concerns would need to be addressed.

## 4 Livestock Breeding Methods

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### 4.1 Introduction

Early on during the course of the first workshop, participants' perceptions of a typical British livestock farm and, in particular, how farmers go about breeding their animals, were explored. This was followed by a presentation and short discussion of Assisted Reproductive Technologies (ARTs) currently in use to provide a context for exploring animal cloning as an ART.

### 4.2 Perceptions of the 'Typical' British Animal Livestock Farm

There was widespread recognition that the *romantic* image of the farm as some rural idyll was a thing of the past – or, as some pointed out, the only time you would experience it today would be if you visited a farm that had been turned into a visitor attraction:

*"I've been to that open farm too with my granddaughter with the school and I thought it was lovely, you know. The hens are running about, the wee baby chicks, like everything all natural, with nature how it should be." (Belfast WS1)*

Farms and farming have become larger, more automated and more industrialised and this is seen as a reflection that a farm is a business which is profit driven:

*"Well, farms are getting bigger. The small guy with maybe a 10-12 hectare holding is just going, slowly. It's all going into massive big herds of 200-300 whatever it may be - pigs, sheep and cows." (Belfast WS1)*

*"... Yes, there were idyllic farms. Even now, driving along the motorway or anywhere, you don't see cows or sheep out like you used to." (Croydon WS1)*

Participants also described images of farms as production lines and animals being fed 'unnatural' food:

*"I just see like a big rotating wheel and a big rotating belt and it will just be like a continuous thing and they all get the same (treatment). At the end of the day they are all going to be killed and enter the food chain." (Belfast WS1)*

*"We'd love to think it was all organic and sheep and cows roaming out there and eating natural foods, but you think of sacks of pellets and god knows what's in the pellets, they're fed to animals." (Croydon WS1)*

*“Well, I actually used to work in a place that made the cattle feed and as x was saying, we used to get a lot of feed for dairy cattle. In the feed was the cattle, the diseased cattle were scrunched up into the bone and fed back to the animals again. It was also [used] for dog meat.” (Aberdeen WS1)*

Farming was also associated with long hours and hard work with efforts driven by quotas and subsidies.

Although one participant described a very positive image of a dairy farm, he was very much in the minority:

*“I’ve never seen such wonderful efficiency. The cows are all roaming around, beautiful, spotless, clean pumping stations - whatever they are called, milking parlours, and I’m impressed with the way things have gone.” (Aberystwyth WS1)*

For most participants, increased industrialisation was associated with the growth of intensive farming practices, something many took exception to largely on the grounds of animal welfare issues. These concerns had been highlighted by a number of recent TV series about poultry farming:

*“You’ve got your free range that are out eating everything outside but the other ones don’t even see daylight...”*

*...You must have watched Jamie Oliver...*

*..It was horrible...*

*...It was Hugh...*

*...It was disgusting.” (Aberdeen WS1)*

*“Chickens are so deformed they can’t hold their head up because they’re pumped with hormones and things.” (Croydon WS1)*

*“I watched the Hugh Fearnley-Whittingstall programme on the chickens and it is horrible because it’s a genetic breed that grows really fast. It can hardly walk by the end because they are so big. They are slaughtered, at 39 days they are big enough to eat.” (Aberystwyth WS1)*



There were references to chickens being de-beaked and pigs kept permanently in cages:

*“There’s pigs put in crates and they don’t even move them, they’re just there to breed, continuously stuck in a crate and never moves, just breeds.” (Belfast WS1)*

One participant in Aberdeen spoke about the fact that dairy farmers send bullocks to be slaughtered as soon as they are born, something he considered to be very wasteful:

*“We don’t use enough of the products. The dairy farms keep the females for milk but they get rid of the male cows, they kill them. At a really, really young age they’re put down because there’s no market for them.” (Aberdeen WS1)*

Organic farming was sometimes held up as a counterpoint with some participants perceiving it to be closer to their ideal of animals being raised ‘naturally’ but even here, they acknowledged that this was probably not an accurate picture and that organic farms are run very much as businesses.

The drive towards greater industrialisation and the growth in intensive farming practices was sometimes felt to be a result of the pressure that the large supermarkets bring to bear on farmers:

*“I just get the impression from the media recently that the supermarkets have their set prices and put a lot of pressure on the suppliers, so the prices go down and it has an impact on how animals are treated. It all comes from the top of big businesses.” (Belfast WS1)*

There was also recognition that consumers are, in part, to blame through choosing to buy cheaper, mass-produced food without stopping to think about animal welfare issues:

*“I don’t think folk really bother as long as the price, [ ] nobody is bothered about that stuff...”*

***...Would you all agree with that, to be honest it’s not the sort of thing that you’d even be worried about?...***

*...I wouldn’t...*

*...I think you only get concerned when you see the programmes on the television. Most of the time you don’t give it a thought and then for a week or so you’re concerned and then it drops to the back of your mind again.” (Aberdeen WS1)*

### 4.3 Livestock Breeding Methods

It was widely appreciated that when it comes to breeding their animals, farmers do not allow 'nature to take its course' but instead actively manage the process. There was some recognition that farmers select certain animals on the basis of their pedigree or choose certain breeds on the basis of known characteristics and use these to try and produce animals that share these traits:

*"They are going to try and actually get the best milk cow - to actually get the most milk out of her. So they might bring a different breed in to actually go with that cow." (Croydon WS1)*

*"Plus the fact you can increase the quality of your stock..."*

*...Yeah, because of bloodlines and things...*

*...[ ] if they are milk cows they have got to get pregnant so you don't want them just getting pregnant to any old bull...*

*...They are probably selective." (Aberystwyth WS1)*

There were a few concerns that selective breeding can be taken to extremes:

*"Have you ever seen a Belgian Blue? They are disgusting and these animals have been bred for meat obviously, beef cattle and they've developed their back end. And it's so developed, like the chickens that you were talking about earlier, they can hardly walk because of this breeding and that really, to me, that is going too far." (Aberystwyth WS1)*

Aberystwyth was chosen as a more rural location and it was noticeable that participants at those workshops were much more in touch with how farmers go about breeding their livestock. One participant was particularly knowledgeable and was aware of all the detailed record keeping that was used to ensure farmers breed from their 'best' stock:

*"It's being done scientifically now. I mean for years now, for example, the dairy cows, the improving type of farmers will record the performance of the cows, the litres, the butter fat content,[ ] you will record your sire for whatever quality you want, whether it's milk yield, whether it's butter fat, whether it's a low cell count. So it's a breeding process which has gone on for years..."*

***...So you collect all this data, how does that then influence how the farmer goes about breeding?...***

*...When you choose, for example now, with your dairy bull, you'll choose a sire with proven records or perhaps if you are doing a beef animal, you will choose a bull maybe because it gives you an easier calf, or [ ] you will*

*record how quickly it puts on weight in terms of its feed conversion. So you are looking [ ] for the genetic features of that animal which you want.”*  
(Aberystwyth WS1)

Moreover, while participants from other locations were prepared to accept the fact that farmers control the breeding process, those in Aberystwyth felt it was nothing less than good husbandry:

*“I think any farmer is going to have to use selective breeding methods and they’d be foolish if they didn’t because they’d end up with weak cattle. I mean it’s something they do, no matter what kind of farming.”*  
(Aberystwyth WS1)

A number of assisted reproductive techniques (ARTs) were explored with participants and their responses are detailed below. The information they received is shown in the text boxes.

#### 4.3.1 Artificial Insemination

##### **Artificial Insemination**

Used by breeders for hundreds of years although has come into widespread use only in the last 50 years

Involves the collection of semen from bulls which can then be used to artificially inseminate cows (also used with other livestock)

It is possible to freeze the semen, store it for longer and make it more widely available

**Artificial Insemination** (AI) was mentioned spontaneously in all sessions; indeed, this was the only form of ART of which most participants were aware. It was known to have been in use for many years and was felt to offer breeders a range of benefits including:

- cost saving (e.g. no need for each farmer to keep their own bull)
- convenience (e.g. easier to ship semen off to lots of farms instead of taking the animals)
- safety (e.g. bulls are potentially dangerous for the farmer and can damage themselves and/or the cows in the mating process)
- greater probability of success (both in the sense of ensuring the female falls pregnant and in terms of passing on certain traits).

Participants were unsure just how widespread its use is or which types of breeder would use it or with which types of livestock it is used. It was mainly associated with cattle breeding and possibly, pigs. Sheep were often assumed to be bred using more natural methods whereby the ram is introduced into a field of ewes. Most participants assumed it would not be used with poultry.

#### 4.3.2 Oestrous Synchronisation

##### **Oestrus Synchronisation**

Involves giving hormone implants and injections to ensure a group of cows are ready for breeding at the same time

In one sense, it is a bit like a contraceptive pill in reverse

Often used in conjunction with AI

No one had heard of this technique and there were concerns relating to the use of hormones and whether these could have an effect on humans, for example obesity in children:

*“Is it just because we are feeding our kids junk food or is it actually what’s in the food we’re feeding them?” (Croydon WS1)*

#### 4.3.3 Embryo Transfer

##### **Embryo Transfer**

Just as AI is used to produce lots of calves from a single, prize bull, embryo transfer is used to produce more offspring from a prize cow

- the prize cow is stimulated with a hormone to produce a number of eggs at once
- she is mated (either naturally or by AI) and many of the eggs are fertilised and start to develop
- the embryos are flushed out surgically and implanted into the uterus of surrogate mothers where they are brought to term

The embryos can be frozen so they can be stored for longer and made more widely available

Apart from a couple of the more knowledgeable participants in Aberystwyth, this was an entirely unknown technique and one that gave rise to a number of animal welfare concerns. These related to the impact on the prize cow of the hormone stimulation and

the surgical flushing out of the embryos, whether the process can result in abnormalities in the eggs and the role of the surrogate mothers:

*“What happens to the surrogate mums? You know, are they just every couple of months popping out a couple of babies and then it gets another jab and pops out another couple of babies. Is that her life? Is that it for her?” (Aberdeen WS1)*

#### 4.3.4 In Vitro Fertilisation

##### **In Vitro Fertilisation**

This is a similar process to embryo transfer except the unfertilised eggs of the prize cow are fertilised in an incubator before being transferred to surrogate mothers

This is the same process used in humans, producing so called “test tube babies”

This technique was familiar to participants through its human application rather than as a technique used by livestock breeders.

#### 4.3.5 Sexed Semen

##### **Sexed Semen**

The purpose of this is to produce a higher proportion of a preferred sex of calves. For example in a dairy herd it would be preferable to have a higher proportion of female calves

As with most of the other techniques, this was something most participants had never come across before.

Overall, participants were surprised to discover these various methods of ART were currently being used by livestock breeders in this country. Although they had some concerns about individual techniques, they were often more concerned about the way livestock are treated during the course of their lives as opposed to the methods of breeding that are used:

*“I’ve got to say, I’m more concerned about how the animals are looked after, their welfare, rather than how they are reproduced in the first place. I don’t think this is really a great concern to me.” (Aberystwyth WS1)*

#### 4.4 Cloning as Another Assisted Reproductive Technology

During the first workshop, participants were presented with some information about the use of animal cloning using somatic cell nuclear transfer (SCNT)<sup>10</sup>. They were also given information in the form of fact sheets and some suggestions for websites to visit. This information helped address some of the misconceptions participants might have had:

*“I was going along the lines of thinking when you read these sorts of science fiction books, they took this little bit off and they put it in an incubator and it grows there...”*

*...I actually thought it was growing in the labs sort of thing more than what’s...*

*...Yeah. You didn’t sort of realise that it’s still going to need three sheep.” (Aberdeen WS1)*

*“Whereas before, I was totally against it because I thought it was the same as - like five legs and seven eyes and what have you...”*

***...And now having seen that?...***

*...I think the way that they are doing it or the way it’s been explained that they are doing it, it’s a lot safer, I think.” (Aberdeen, WS1)*

A common immediate reaction to the information presented during the first workshop was that cloning was going to become a common and widespread method of animal livestock breeding in the future – possibly, the only method. This assumption often amplified participants’ initial concerns as they conjured up images of fields full of clones. This impression was often modified over the course of the two workshops; having read their fact sheets and carried out their own research, many participants came to realise that cloning was only going to be one method of breeding and, at least to begin with, one that would probably only be used by a relatively small number of breeders.

Nevertheless, it was clear that most participants did not perceive animal cloning to be ‘just another form of ART’. Although existing methods require breeders to give ‘Mother Nature a helping hand’, they were not seen as ‘interfering with nature’. This was in marked contrast to how participants perceived animal cloning. Whereas all of the

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<sup>10</sup> The technique of animal cloning referred to throughout this report is the use of SCNT to create a clone from the somatic cell of a donor animal.

current methods still involve taking sperm from a male and joining it with an egg from a female, cloning was seen as representing a step too far, one that involved crossing a line between natural and unnatural:

*“Out of all the things you’ve told us there, it’s the one that’s most against Mother Nature. I mean, they’re all a little bit against Mother Nature but that’s the one that’s most against nature.” (Aberdeen WS1)*

*“If it’s interfering with nature...*

***...Do you think this is interfering more than some of those other techniques?...***

*...Yeah, because the other processes just gave Mother Nature a helping hand, this one is like...*

*...You are taking that decision.” (Aberdeen WS1)*

*“You see for me, when we looked at the other assisted reproductive technology, all these things, it looked – okay, they weren’t natural but they seemed to be a natural process. You are putting the sperm into an egg and you are doing it, but when you look at this and you see there’s no chromosomes from this one, it’s done this way, to me, it still doesn’t sit right with me.” (Aberystwyth WS1)*

## 5 Levels of Knowledge and Concern

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### 5.1 Introduction

At the beginning and end of each workshop, participants were asked to rate their levels of knowledge and how concerned they were about animal cloning.

**How much do you know about Animal Cloning?** Please give a score between 0 and 10 where 0 means you know nothing at all about it and 10 means you know a great deal about it.

**How worried are you that animals can be cloned?** Please give a score between 0 and 10 where 0 means you are not at all worried and 10 means you are extremely worried.

In this way changes in knowledge and concern were tracked as the workshops progressed. The main findings are summarised in this section.

It is important to note that there was considerable variation in the scores of different participants at each location and it was not unusual to find in the same workshop some participants who gave very low ratings and others who gave high ratings. It is also important to note that the sample size is small (n=70) and the findings should be treated qualitatively (i.e. indicating broad patterns) rather than as robust quantitative measures.

### 5.2 Changes in Knowledge and Concern Ratings

At the start of the workshop, most participants felt they knew relatively little about animal cloning; on average, scores fell somewhere between 0 and 5:

*“I mean, I know it happens and I know it’s about but I haven’t got a good understanding of why.” (Aberdeen WS1)*

Concern scores started off, on average, at the mid-point of the scale. This score was often used to reflect a neutral position as many participants felt they did not know enough about cloning to decide whether or not they should be worried. In this sense, while the knowledge dimension can be thought of as going from ‘low’ to ‘high’, the concern dimension runs from ‘unconcerned’ through a neutral mid-point to ‘concerned’:

*“I’m not particularly worried at the present because I do not know what the outcome of cloning would be.” (Aberystwyth WS1)*

For most participants, their levels of knowledge and concern at the start of the process were largely a function of media coverage and popular culture:



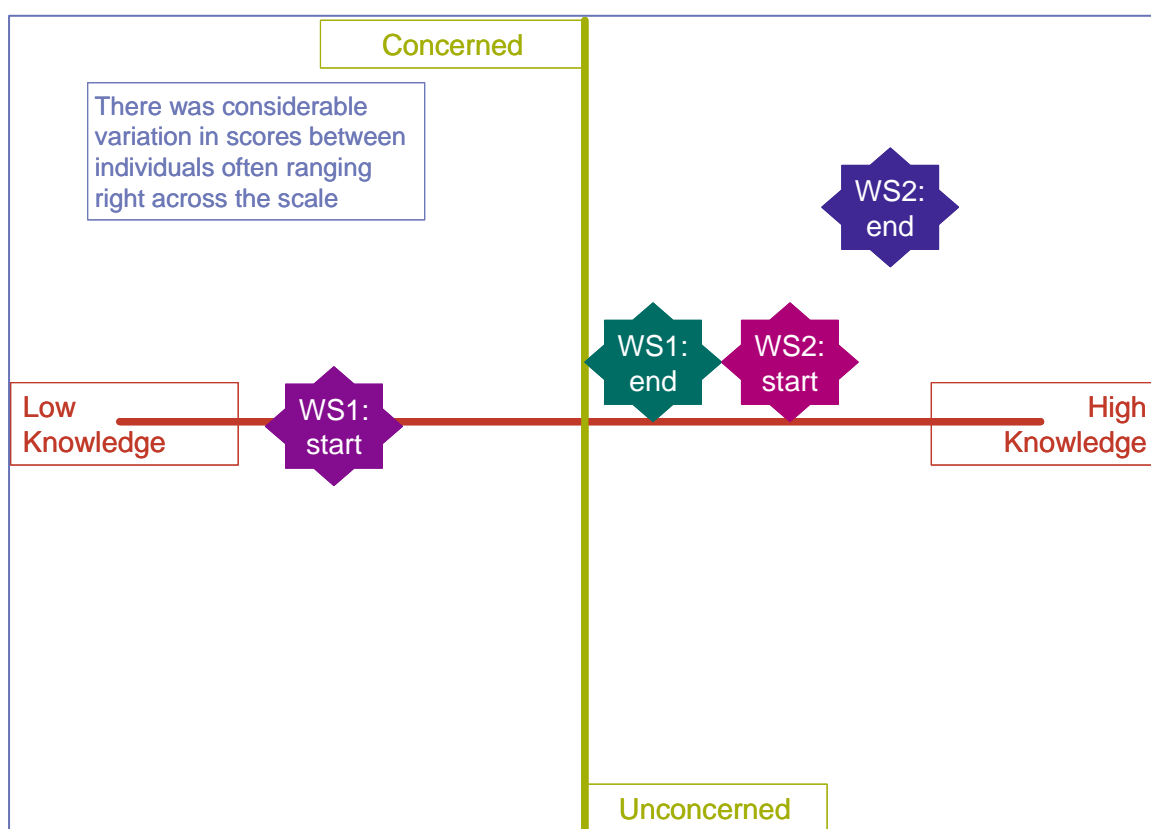
*“Jurassic Park - they cloned something to get things for Jurassic Park.”  
(Croydon WS1)*

Moreover, participants acknowledged that much of what they see, hear and read through the media tends to present things in a less than balanced manner:

*“I think the general public do read these headlines because we are not informed enough about these things. We just get these crazy headlines. So it is scaremongering in a sense, if you see it that way, rather than if you’ve got an informed choice and a level of understanding about it, then you can of course, you’d look at it from a better position.” (Aberystwyth WS1)*

Knowledge ratings and concern scores both increased during the course of the workshops such that by the end of the second workshop, they had risen to an average of around 7 out of ten (see Figure 1).

**Figure 1: Knowledge and Concern Ratings**



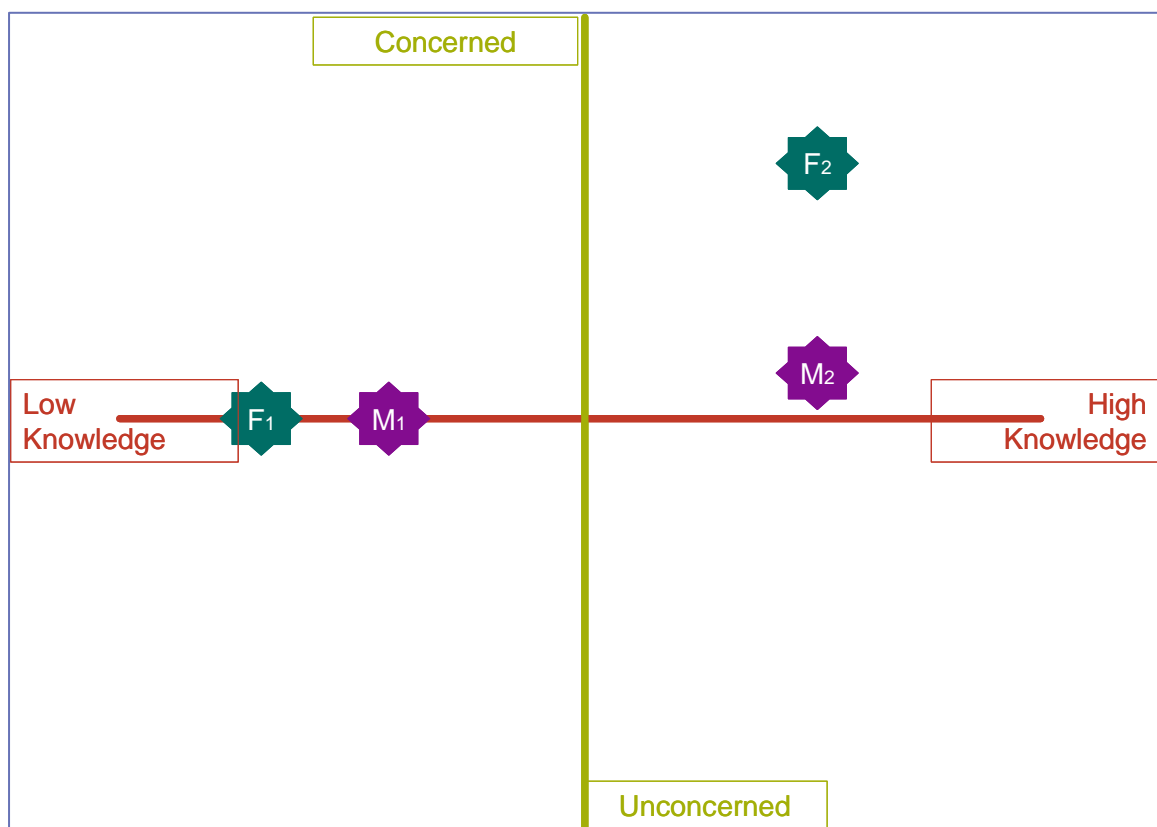
At the start of the process, there was considerable variability in the individual knowledge scores but during the course of the work, knowledge scores tended to converge. In contrast, scores on the concern scale became increasingly polarised with some

participants becoming increasingly concerned and others (fewer in number) becoming less concerned.

Despite the initial low knowledge scores, it was clear that most participants were able to get to grips with both the concept of animal cloning and its implications for the food chain. Although they struggled to understand the finer detail of the science underpinning the work, the debate was often sophisticated and informed.

### 5.3 Knowledge and Concern by Gender

There were clear gender differences in the ratings. Men started off giving themselves higher knowledge ratings but, by the end of the process, knowledge scores had converged. In contrast, at the start of the process, levels of concern were similar but by the end concern was greater among the women compared to the men (see Figure 2).



**Figure 2: Knowledge and Concern Ratings by Gender**

F<sub>1</sub>/F<sub>2</sub>: female ratings at start of Workshop 1/end of Workshop 2

M<sub>1</sub>/M<sub>2</sub>: male ratings at start of Workshop 1/end of Workshop 2

## 6 Concerns and Reactions

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### 6.1 Introduction

Participants' reactions to the idea of animal cloning and the concerns that it gave rise to were assessed at various points during the workshops including:

- initial, unprompted top-of-mind associations with the term 'animal cloning' (WS1)
- moderated discussions of questions and concerns following presentations on methods of selective breeding and animal cloning (WS1)
- moderated discussion of what participants had learned from their 'homework' and their own research (WS2)
- arguments for and against buying/eating food derived from clones and their offspring (WS2)
- comments on self-completion questionnaires (at the beginning and end of both workshops).

There were a number of developments that occurred during the course of the workshops which received media attention including the publication by the FDA of its final opinion on the safety of food derived from clones and their offspring (15<sup>th</sup> January 2008), the publication of the EFSA's draft conclusions (11<sup>th</sup> February 2008) and the publication of the opinion of the European Group on Ethics (16<sup>th</sup> January 2008). As far as it is possible to tell, it seemed that no one picked up on the publications of the two European groups. Some participants, however, were aware of the FDA conclusions either through reading about the publication of the final report or through awareness of its draft findings which were substantially the same (the draft findings were referred to in some of the fact sheets).

The analysis of the concerns and reactions expressed by participants identified 16 interrelated themes. Although some of these emerged, or were given greater prominence at different stages of the process, they arose in all locations across the UK.

The 16 themes are listed below and considered in greater detail in the rest of this section of the report.

Theme 1: Definitions	Theme 9: Animal welfare
Theme 2: Why clone?	Theme 10: Food
Theme 3: Possible benefits	Theme 11: Money
Theme 4: Potential negative consequences	Theme 12: Controls and regulations
Theme 5: Science and research	Theme 13: Public opinion
Theme 6: Dolly the sheep	Theme 14: Consumer choice
Theme 7: Where is it leading?	Theme 15: The inevitability of cloning
Theme 8: Moral issues	Theme 16: Can we trust them?

## 6.2 Theme 1: Definitions

A small number of participants offered some form of definition of cloning usually when asked about their immediate associations although, in subsequent discussions, participants rarely referred to such definitions:

*“Identical in every way to the animal from which it came.” (Aberdeen WS1)*

*“Recreating a copy of the original.” (Croydon WS1)*

*“Several animals (loads) made out of one.” (Belfast WS1)*

*“Having the same genetic make-up.” (Croydon WS1)*

Although the potential advantages of cloning over other methods of selective breeding were included in the information provided to participants, these went largely unnoticed.

Participants often claimed that they understood the difference between cloning and GM, nevertheless they sometimes made comments that suggested they were confusing the two. There was also some confusion between cloning and other areas of work such as stem cell research and growing human body parts. The example of an ear that had been grown on the back of a mouse was mentioned on several occasions:

*“They cloned ears on rats and mice, they’ve cloned ears but that’s for medical so, is it good or is it bad?” (Aberdeen WS1)*

The fact that clones occur naturally was not seen as reassuring, partly because examples in the animal kingdom seem to have little immediate relevance (those mentioned in some of the information included amoebae and aphids) and partly because, although cloning occurs in plants and is widely used in horticulture, some participants perceived plants and even insects as non-sentient and far removed from mammals or humans:

*“I know that we clone plants and things like that but...*

*...That’s not naturally cloned though...*

*...But plants and you know those greenfly things, they are not really living, breathing creatures are they, if you know what I mean.” (Aberdeen WS1)*

### 6.3 Theme 2: Why Clone?

This was a question that was repeatedly asked at all stages of the process and it was one that most participants felt was never satisfactorily answered:

*“Is it because we need more meat etc. or just because they can?” (Aberdeen WS1)*

*“What is the real purpose of cloning?” (Belfast WS1)*

*“What are the benefits?” (Aberystwyth WS1)*

*“Well they’ve done this, but what benefit, why spend all that money to clone something unless it’s of any benefit to anything or anyone, in my opinion?” (Aberystwyth WS1)*

Participants wanted to know who was going to benefit from this technique:

*“In whose interest is this?” (Croydon WS1)*

*“Who’s making the money?” (Croydon WS1)*

When asked who they thought might benefit from it their suggestions included biotech companies, livestock breeders, farmers and supermarkets, all of whom might stand to make money from animal cloning. They also acknowledged that it might have an impact on the price and/or quality of food which might represent a consumer benefit (see Theme 10: Food):

*“Who benefits? How do we benefit as the consumer? I mean, do we get better tasting meat or cheaper meat? Meat is already cheap enough in my view, in fact it’s too cheap in many ways. The only people who are*

*benefiting are the biotech companies, genetic pioneering companies and the big corporate farmers with the prize bulls. How do we benefit as consumers? Why should we take a chance on this for no seen benefit to us?" (Aberystwyth WS2)*

*"Looking at the cost factor, is this going to be for the profitability of supermarkets or is it going to be for the benefit of having a less expensive commodity for the end users, the consumer? Is it coming down to us or is it looking at the industry gaining for profits?..."*

*...But is it not going to be more expensive?...*

*...I mean, they would be mass producing this and it's going to be 100% spot on. They're not going to incur the bills of the vets and everything else to maintain the animals so therefore there's less overheads. So therefore, they should be able to produce it at less cost. Is that going to be passed on to us?" (Belfast WS1)*

This lack of any clear benefit of the technology, coupled with a sense that the public is being 'railroaded' into accepting it (see Theme 15: The inevitability of cloning), often created a feeling of mistrust (see Theme 16: Can we trust them?).

#### 6.4 Theme 3: Possible Benefits

Not surprisingly, given a lack of clarity over why the technique is being developed, participants struggled to identify many benefits of it. A small number mentioned that it would enable breeders to select their best animals and have a greater degree of certainty of passing on desirable characteristics. This might result in:

- a more efficient, predictable breeding process:

*"Well, I guess it comes back to the breeding thing. I know that by doing this, I'm going to result in this and there's no uncertainties. And I know that every time I want 100% I'm going to get 100% every time and there's no variability." (Belfast WS1)*

***"So why would you use cloning for that rather than some of the other techniques we talked about?..."***

*...Because obviously, at some point, they believe it's going to be more of a guarantee. Obviously [it's] early stages yet but they obviously believe at some stage it will be more of a guarantee to be right and it's going to work out cheaper...*

*...And you're getting an exact replica whereas if you use artificial [insemination] two chromosomes mixed...*

*...Consistency in quality, isn't it?" (Aberdeen WS1)*

- improved animal welfare e.g. fewer unwanted bullocks being sent to slaughter:

*“I suppose in the case of dairy it would be a good thing because obviously, as we said earlier on, if you’re producing males they have no quality of life at all, they’re kept for three or four days and then they’re shot. So you are creating a better life for the female ones that are produced.” (Aberdeen WS1)*

- improved disease resistance:

*“Taking the best of each species to reduce weakness.” (Croydon WS1)*

*“If we found that one cow from natural breeding or whatever had a resistance to a disease, and we tried breeding that cow, if we’re lucky we might get another one. If we’re unlucky, we might not get anything, you might do it ten times and it might not pass the right gene across. However with cloning, once you’ve found a resistant strain or resistant type of animal to a disease like Foot and Mouth or BSE whatever it happens to be, if you can then find that and interbreed that in other animals, providing it was safe to do so, obviously you’d have to test it. Then you’ve obviously destroyed that disease whereas selective breeding, the current method, you wouldn’t do that.” (Croydon WS2)*

- furthermore, if cloning can help eliminate diseases within the livestock herd, this might result in food that is potentially safer:

*“I reckon it’s to stop diseased animals getting into the food chain. If they have a pure bred animal the meat and stuff should be healthier.” (Belfast WS1)*

*“On the plus side, we said well, perhaps here we’ve got the potential to make things safer where we know we can be 100% sure that a beast is BSE free. So perhaps here, we’ve got a possible health benefit.” (Aberystwyth WS2)*

Although many participants questioned the value of animal cloning in terms of food production, they often felt that there were more acceptable ways in which cloning might be used. The most obvious of these related to possible medical benefits such as being able to clone an organ to replace a defective one without fear of rejection:

*“Well, the likes of being able to produce body parts for humans. You know, like they go on so much about when you die, giving permission to leave your body parts, your organs. Well, that might be beneficial to the human race. I don’t know whether they can be cloned, the likes of kidneys, eyes, whatever.” (Belfast WS1)*

Another suggested acceptable use of animal cloning was in helping to conserve endangered species:

*“One of the things I put was endangered species. Obviously because your environment and your planet is changing and a lot of people are concerned, and as some species die out it’s obviously having an effect on the planet. So would it be [possible] to clone some of these species that are dying out so that they can help sustain the planet?” (Aberdeen WS1)*

This suggests that for many people their objections were not so much about the technique itself but the ends to which it is put:

*“I’m not scared of it and I’m all in favour of it, but for what end purpose? If it’s for producing food, meat, then I’d be concerned. Again, if it was done for medical purposes and curing illnesses, fine, I have no objections to it whatsoever...”*

***...So why would you have concerns if it was being used to produce meat?...***

*...I wouldn’t be happy to eat a piece of beef that had been cloned because I wouldn’t consider it as being a natural piece of, a natural product if you like.” (Aberystwyth WS1)*

*“If it’s for medical research then I think it’s okay but if it’s to help our Sunday roast, no, I don’t think so.” (Aberdeen WS1)*

## 6.5 Theme 4: Potential Negative Consequences

While the benefits of animal cloning were not immediately or readily obvious, participants had little difficulty in identifying what they considered to be possible negative consequences. These fell into four main areas.

### 6.5.1 As a technique in its own right

Cloning was perceived to be a new and unproven method, something that was still at an early experimental stage, and this gave rise to questions about whether it works and how safe it is. Given this state of affairs, participants often felt it was too early to be able to tell what the long-term consequences of cloning might be:

*“We are not actually sure that it works. Obviously, it has been proven to work but it’s not, we are not, we weren’t sure just...” (Aberystwyth WS1)*

*“I think the real problem is, they can’t really answer these questions truthfully because it hasn’t happened yet so they don’t know.” (Aberdeen WS1)*



## 6.5.2 Possible harmful effects on the clone (see, in addition, Theme 9 Animal welfare)

This refers to a number of concerns including:

- clones age prematurely possibly because they are cloned from an adult cell (their 'biological clock' is set to the age of the donor):

*“One of my worries is, I remember when Dolly the sheep was born, you know, is Dolly the sheep, is she nought or is she three years old? Is the cell three years old or is it nought?” (Aberystwyth WS1)*

- clones are associated with shortened life spans and are prone to disease/ deformity
- the danger of passing on undesirable traits:

*“Could it possibly create potential animal health problems by replicating a weak gene? If say, for example, some sheep were predisposed genetically to Blue Tongue or vCJD or BSE, would you actually be replicating a weak gene?” (Aberystwyth WS1)*

- multiple copying of DNA can lead to degradation which may mean that if clones are made from clones the risk of mutations or other problems could be increased:

*“Are we going to clone a clone? At the end of the day the long term effects - we're going to keep copying and copying and copying until maybe 20-30 years down the line before we're made aware of this, this clone is completely riddled with new diseases that people haven't come across.” (Belfast WS1)*

- cloning was similar to 'incest' or 'inbreeding' and may encounter the problems this can give rise to:

*“To me, it's a little bit like inbreeding that they used to have like in the royal family. It ended up that some went mad or whatever.” (Croydon WS1)*

## 6.5.3 The creation of new diseases or animal 'freaks'

A widely held concern was that the cloning process may (in some unspecified way) give rise to mutations or alterations to the DNA that could result in the creation of new, and possibly deadly, diseases or other defects that could impact on humans. This was a strong irrational fear – participants could not suggest what might go wrong in the first place or what the consequences might be. Nevertheless, it was frequently suggested:

*“Over a period of time, would it create problems because obviously the mutating and all the rest of it? Would it create problems, diseases?...”*

***...So the actual process of cloning you think might lead to more problems?...***

*...I mean if there [are] diseases [that] come about, how would you treat them if you don't know what they are?” (Aberdeen WS1)*

*“We are unsure whether some disease may come from that creature and be able to be transmitted to humans.” (Belfast WS2)*

One or two participants challenged these views but often to little effect. The following quote is in response to another participant using the example of thalidomide to suggest that cloning may have some unseen long-term impacts on human health:

*“But why should a clone, one that contains the same chromosomes of any, take for example, sheep, have the same effect as thalidomide which is a chemical?” (Aberystwyth WS1)*

One participant with knowledge of horticulture spoke about plant cuttings (a form of cloning) that mutate spontaneously and was worried that something similar might happen with animal clones:

*“That is my concern, that I've seen it in plants, so it happens in nature.” (Croydon WS1)*

In a different vein, some participants imagined animal cloning might result in selective breeding methods being taken ‘too far’ resulting in the creation of ‘freaks’. Again, this was not a rational concern since, unlike other methods of ART, cloning does not mix or alter the genetic material passed on to the resulting offspring. It seems to reflect a wider concern about the direction that animal livestock breeding may take:

*“Well, I've put down like extra legs etc. Do you know what I mean, things like that, so that's one of my reasons why it's not right. You don't need a sheep with five or six legs.” (Aberdeen WS1)*

*“I can see it coming, within ten years, they are going to take off bits of that DNA and the animal is going to have no brain so nobody can say you are being cruel. They will say it's not alive. It's going to have no eyes, no feet, that is scrapped, not needed anymore, it's just going to be a monster type of thing, living in a shed, just being fed and watered.” (Aberystwyth WS1)*

#### 6.5.4 Environmental impacts

As mentioned earlier (see 4.4), there were initial concerns that animal cloning would become the main, or even the only, method of breeding used by farmers in the future and that this could result in the situation where all livestock animals are clones:

*“50 years in Britain we’ll end up with two sheep, one female, one male, you know, multiples.” (Aberdeen WS1)*

This concern was often allayed by the information in the fact sheets and participants’ own research.

A commonly expressed concern, and one that persisted even after participants began to realise cloning may not be used so widely, was that over time the process would result in reduced diversity as more and more animals were derived from a small number of donors. This would result in a narrowing of the gene pool which could have longer term consequences such as the appearance of a new disease to which none of the clones has any resistance:

*“I would have thought that if it did get into the food chain and was widely accepted and passed by the FSA, that it’s going to encourage cloning and that in itself, I don’t believe is a good idea, because it just cuts out all diversity. So with it being passed and accepted, it’s going to encourage it.” (Belfast WS2)*

*“If you produce all these cows that are the same, if you have a disease that attacks them, would it wipe the whole lot out quicker than where you’ve got different ones now that some are more resistant? So it would spread quicker because there’s more of the same sex ones with the same disease.” (Aberdeen WS1)*

One participant felt this was something that could easily be kept under control by ensuring that clones are produced from a wide cross-section of donors and not just a very few. However, this view was not typical.

A further possible consequence of cloning was that all animals of a given breed would end up looking exactly the same:

*“Do you know something that has just occurred to me is, how hard it would be to go to an agricultural show and see a row of animals who are exactly the same? How would you judge them? They would all have to have a prize.” (Aberystwyth WS1)*

*“Will all the sheep have the same personality?” (Belfast WS1)*

There were also concerns that certain breeds that do not offer the most desirable traits will not be chosen as donors and, over time, these breeds may disappear, thus further reducing diversity:

*“We have different breeds for different things and if you start making just one breed that’s superior, those other breeds will just die out.” (Croydon WS1)*

One participant raised the concern of clones being ‘accidentally released’ into the environment. This is possibly an example of confusion between cloning and GM since the impact of releasing a clone should be no different to the donor animal itself being released and free to breed. Nevertheless, it highlights how concerns that originate in relation to one issue are sometimes transferred to new situations:

*“I don’t see it as much of a problem with large mammals but anything that could escape into the environment is always potentially a risk to disrupt the genetic base of the environment. So I would be concerned [ ] if it is with smaller mammals and things which could get into the environment.” (Aberystwyth WS1)*

## 6.6 Theme 5: Science and Research

Animal cloning often gave rise to associations with science, scientists, research and experimentation. Some of our participants had a largely positive view of science:

*“I just think it’s a natural progression. You know, you have to find out about these kinds of things, you’ve got to keep going, science has got to keep evolving. I mean, you can’t just stand still, there are new things going on all the time. If you said no, you can’t do that, then nothing would ever progress.” (Aberdeen WS1)*

*“It’s brought amazing things. Scientific research has brought pretty much every modern appliance and invention which is pretty good. Life would be pretty grim without my MP3 player or whatever, but they’ve brought some bad stuff as well.” (Aberystwyth WS1)*

Others adopted a more neutral position, for example:

*“I think it’s just scientific experiments.” (Croydon WS1)*

while yet others tended to have more negative perceptions:

*“Yes, scientists doing weird experiments and nobody knows what they are up to.” (Aberystwyth WS1)*

As we have already seen, the values participants attached to science and scientists were linked to the ultimate purpose of their research. Thus, using cloning to further human health and welfare was acceptable while using it to make money through the production of cheaper or better quality food was less acceptable. Participants often questioned the motives of the scientists and this had implications for the extent to which they felt they could trust them (see Theme 16: Can we trust them?).

## 6.7 Theme 6: Dolly the Sheep

Dolly is an icon of animal cloning. She is widely and spontaneously associated with animal cloning and, for some participants, the only thing they felt they knew about the topic at the start of the research. She held a certain fascination for participants who were curious to find out more about her and, in particular, whether she lived a 'normal' life. For example, was she capable of breeding, did she have offspring of her own and if so, did she have offspring using 'normal' methods? Did she behave like any other sheep and was she accepted by 'normal' sheep?

It was also clear that some participants had heard of various problems associated with Dolly which they were keen to explore. During the first workshop, participants were encouraged to go and find out for themselves rather than being given a particular interpretation of the events surrounding Dolly. Amongst other things, they were directed in the fact sheets (see 9.5.2. and 9.5.10.) to the report by the Roslin Institute (who were responsible for Dolly). It was clear when they came back to the second workshop that many of their doubts had not been put to rest and, in some cases, what they had found out only served to fuel their wider concerns about animal cloning. Indeed, it became clear that, rather than taking on 'heroic' status, Dolly was largely perceived as a 'victim'.

The main concerns relating to Dolly were as follows:

- Dolly died prematurely because her 'biological clock' was 6 years old at birth (the age of the donor):

*"It was supposed to be a miracle thing that they had cloned this sheep, but she didn't live very long and the concern was that her DNA was already old compared to what they'd cloned her to." (Aberystwyth WS1)*

- Dolly died prematurely because of defects/problems that were brought on by the cloning process:

*“I believe that Dolly the sheep had like hereditary problems and died young.” (Aberdeen WS1)*

*“I think Dolly died didn’t she...”*

*...It raised certain doubts about just how viable the process is at the moment because when Dolly was, when Dolly was first spoken about, it was the breakthrough had come through. But they have subsequently found new problems, it wasn’t as straightforward as it was suggested.” (Aberystwyth WS1)*

- The fact she was ‘put down’ early was perceived by some sceptics as signalling that scientists had something to hide:

*“Should they have let her carry on until she died to find out the exact causes and reasons, rather than just go, ‘oh well, this can happen when they’re bred indoors so before it develops we’ll be humane and put her out of her misery?’ I think sometimes being humane, are you trying to hide something?” (Croydon WS2)*

- Similarly, one participant had tried in vain to find a copy of Dolly’s post-mortem report on the web and concluded it was being kept out of the public domain, again because scientists had something to hide
- The fact her birth wasn’t announced until she was a year old further fuelled suspicion among some – maybe the scientists were trying to keep it hushed up and it somehow got out
- Dolly was not a complete clone of the donor as she also had some DNA from the egg cell donor (mitochondrial DNA) – this was interpreted by the person who read about it as a failure of the cloning process:

*“Actually, having read an article, the study revealed that [she had] a very small amount of DNA outside the nucleus in the mitochondria of the cells that is inherited from the donor egg cell, not from the donor nucleus with the rest of her DNA. So she was not completely identical and given that it took 277 attempts to get to that and it still wasn’t complete. So how many other cases regarding cloning have they not got the complete finished article?” (Aberdeen WS2)*

- One or two participants had discovered that Sir Ian Wilmut has ‘turned his back’ on cloning in favour of other methods (for medical research) and this was interpreted to mean that cloning is not an especially useful/promising technique:

*“The scientist that obviously cloned Dolly the sheep now believes that stem cells should be more important than what cloning is. So he’s now disapproving with what he has done himself.” (Aberdeen WS1)*

## 6.8 Theme 7: Where is it Leading?

Some of the initial top-of-mind associations with animal cloning included images of Frankenstein, Jurassic Park, science fiction and ‘experiments going wrong’:

*“It’s like engineering of animals isn’t it? It’s sort of changing how they normally develop. Frankenstein is another thing when he’s created.” (Croydon WS1)*

Participants recognised that these perceptions were largely over-stated and were fuelled by newspaper headlines:

*“Frankenstein monsters, it’s a headline off things like the Star and the Sun and things like that, you know, emotive.” (Aberystwyth WS1)*

Nevertheless, underlying these associations is a widely held concern that cloning animals is only one step on the road to cloning humans. Irrespective of how people felt about animal cloning, everyone was worried that this was the start of a ‘slippery slope’ that will eventually result in human cloning:

*“What is the reason for cloning in the first place? Why do they want to clone animals and if they clone the animals perfectly as they say, will they then be starting on humans and that’s what I’d be worried about.” (Belfast WS1)*

*“The process of animal cloning is still in early stages but this is the first step towards the destruction of human nature. This process worries me because if they successfully start cloning animals, what next? I am not pro-animal rights but I am strongly against the cloning process.” (Aberystwyth WS1)*

*“It’s been mentioned in the news that they clone people now.” (Aberdeen WS1)*

*“You know, it’s the top of a very slippery slope, where do we go next? What next - humans? It has the potential to be used for ‘evil’ purposes. You know, it might sound like science fiction and sort of paranoia but [it] isn’t that great a huge step to try and think about humans, and especially scientists trying to think about curing diseases, which sounds very positive. But that kind of technology can be used for great evil as well, and there’s just a general sense of unease about that.” (Croydon WS2)*

A further concern was whether cloning had implications for the male of the species; if sperm were no longer needed, this might mean that men were largely redundant. Although this was often discussed in a slightly tongue-in-cheek manner, there was a more serious underlying issue.

The prospect of creating human clones and the possibility that men may no longer have a role in the breeding process gave rise to serious moral questions; it also raised further doubts in people's minds about the extent to which they can trust scientists to act in the best interests of wider society.

## 6.9 Theme 8: Moral Issues

A common top-of-mind response to the idea of cloning was that it represents 'messing with nature' and this could have unforeseen consequences:

*"The DNA for any animal is unique to itself, it shouldn't be messed about with, it's totally against nature to me." (Aberystwyth WS1)*

*"Any interference with nature will always have some pay-off. Unfortunately all too often these tend to be unforeseen or negative and outweigh the supposed benefits of the experiment." (Aberystwyth WS1)*

Some participants objected on religious grounds:

*"I don't agree with it. It's the way things are going, but I mean God created all of us and I don't believe that we should be changing things and recreating the original." (Croydon WS1)*

but irrespective of one's religious views, cloning could still be seen as scientists 'playing god':

*"Who plays God and who has the right to decide what is perfect and what is normal?" (Belfast WS1)*

One participant interpreted the current low success rate of SCNT as 'a sign from nature':

*"Then there was just a general thing, an ethical point then, are we defying Mother Nature, are we going against - and the fact that it took 270 attempts to produce one clone, is that telling us something?" (Aberystwyth WS1)*



## 6.10 Theme 9: Animal Welfare

Participants were aware of, and largely disagreed with many of the intensive farming methods currently in use and which had been highlighted by a number of recent TV programmes (see 4.2). Many participants felt that animals should be treated with dignity and should be allowed to live as normal a life as possible:

*“I certainly believe that animals deserve an equal right to be treated in the same moral [way] as humans. They can’t speak but they still should be treated properly.” (Aberdeen WS1)*

There was a concern that clones would be perceived as ‘less than normal’ and this could result in them being treated less humanely than ‘normal’ animals:

*“What is going to [happen when] we actually start cloning them? Are we going to treat them any worse? Because they’re cloned, they’re not real animals as such, they’re cloned animals.” (Croydon WS1)*

Animal welfare was initially raised as a series of questions – does cloning result in any animal suffering, is the process painful, could it create animal health problems? As participants found out more about cloning, both through the fact sheets and from their own research, their questions began to turn into concerns. Indeed, animal welfare crystallised as a major concern for many participants and, for some, as their main reason for rejecting food derived from clones and their offspring.

Although these concerns were raised by both men and women, animal welfare appeared to be of greater concern among the women.

Concerns relating to animal welfare included:

- the high failure rate with very few attempts resulting in a live birth:

*“1-2% success rate is really low and a lot of those clones are abnormal. So I just think it’s too early for them to be doing this.” (Croydon WS1)*

*“I think the thing that worried me most was that although they’re cloning in America, it’s still hit and miss. There’s still another 270 goes before they get it right, and that’s why it’s proving rather expensive at the moment. You know it’s a bit worrying, major scientific research centres and they’re still not getting it right, are they?” (Aberystwyth WS2)*

*“A website I went on and it said that there was an 85% failure rate. Well no business could cope with 15%...”*

**...In what way are you worried about that?...**

*...Well, from the point of view if it's to give us better food to help the farmers and what have you, 85% failure, that's not helping anybody. Costing money, it's costing animal lives too." (Aberdeen WS2)*

- Large Offspring Syndrome which results in suffering for both the surrogate mother and the clone:

*"It occurs in over 50% of clones but in fewer than 6% of conventionally bred animals. So if they have to have caesareans, the calf is too big, because obviously it's been messing with genes and they've been given calves they weren't naturally meant to have. I didn't like that at all." (Croydon WS2)*

- clones that do reach term often have abnormalities which result in their early death:

*"Well, I went on a pro-animal website but the concerns I had that came across were defects and the rate of miscarriage and larger offspring syndrome, enlarged liver, brain haemorrhages, there's a whole list of abnormalities. I had one bit where it said 65% of the cattle impregnated were still pregnant at day 50 and ended up with only 30% live births and then 35% died before weaning. That's a big mortality and there's got to be a reason why it's such a big mortality." (Belfast WS2)*

*"The thing that shocked me was there was a dog cloned in 2005 and it was the only puppy to survive out of 1,095 cloned eggs transferred into 123 surrogate mothers. When the cloned embryo does not implant successfully in the womb of a surrogate mother, pregnancies often end in miscarriages and can cause pain and distress. Also, the actual pregnancy, the embryos can grow hugely large. Also, when they're born they can be born with underdeveloped lungs, blood strains, imbalances, abnormalities of the kidney, liver, brain, enlarged tongues, intestines and immune system deficiency. And there's loads of other stuff that I got just from this one website." (Aberdeen WS2)*

- the fate of clones born with abnormalities that survive – are they used for further experimentation or put down?

The concerns relate not just to the clone itself but the impact on the donor animal, the egg cell donor and the surrogate mother:

*"How does that animal feel when they are getting...*

*... They are poked and prodded and with this taken out and that put in...*

*...How do they feel? Nobody is taking that into consideration.” (Aberdeen WS1)*

*“Do they use the same surrogate every time? Is she just a surrogate or can she be an egg donor as well?...”*

*...How many times is she used before they dispose of her?” (Aberdeen WS1)*

The fact that all dairy cows need to have a calf each year in order to continue to produce milk (and thus the only difference might be that they carry an implanted clone instead of an embryo conceived by other methods) did not convince people that the surrogate mothers would ‘live a normal life’; the above quote implies that some people had the impression that the surrogate mothers are being used as little more than ‘baby factories’.

## 6.11 Theme 10: Food

Participants had little difficulty seeing how animal cloning could have implications for the human food chain. The debate focused on five key issues.

### 6.11.1 Benefits

There was a debate about whether or not the world was heading towards a food shortage, in which case this could be an argument to support the use of cloning:

*“Why do we need to increase the produce, is there a reason for it? Are we running out of meat that nobody is telling us about or is it for the third world countries? Is there a crisis on our hands that we’re just not being told about? Is it because we eat more meat etc?” (Aberdeen WS1)*

However, many doubted this was the case especially after reading that farmers in the US have been culling animals in response to over-production:

*“It was an article and basically they’re saying that there’s 10,000 plus dairy cattle were killed to stem production.” (Aberdeen WS2)*

*“The fact that farmers in Northern Ireland are being paid, we know, not to rear cows because there’s too much. The beef mountain in Europe pops up every third or fourth year where they have to take the meat out and dump it in the sea. The same happens in North America. So there’s too much meat and the economies of the world dictate that they can’t take the meat and put it to Africa. So is this really to produce more meat or better meat or is it some ulterior motive to get them closer to [cloning] humans?” (Belfast WS1)*

There was also a debate about the quality of food derived from clones; would it be better quality (especially if donor animals are the top quality, elite animals) or would it result in food that was uniformly consistent (since all the animals are derived from the same donor):

*“I was just going to say that these super breeds are all going to bloody taste the same, aren’t they? Are they going to take away variety in flavours by doing this? So there’s all your pork and it tastes the same, is all of your bloody beef going to taste the same?” (Aberdeen WS1)*

Yet others questioned whether it would have any impact on things like taste and flavour as these are as much down to environmental as genetic factors:

*“It’s what they are fed on too, do you know what I mean? Am I not right in thinking when there was a thing about steaks in America - he was comparing the steaks and it was completely down to what that cow had ate, the texture of it, the colour of it, the texture of it before it was cooked. It’s what they were fed, one was grazed in the fields and the other one was fed on grain...”*

*...So at the end of the day it doesn’t matter if they are cloned or not...*

*...Well that’s it, it purely comes down to what the cow was fed.” (Belfast WS1)*

### 6.11.2 Impact on Prices

The question of quality went hand in hand with a discussion about how cloning might affect the price of food (better quality may mean higher prices vs. more of it produced more cheaply should result in lower prices):

*“Well, the price of the meat, and the money that has got to be spent on this, what’s it going to cost us?” (Aberdeen WS1)*

There were concerns that it might result in a two tier market such that only wealthier people might be able to afford the better quality food or, conversely, if food derived from clones and their offspring was cheaper, only the better off could afford to exercise the choice not to buy it.

### 6.11.3 Choice

A key issue was whether consumers would have any choice in the matter. Comparisons were drawn with GM food. Some felt there would be a similar consumer backlash and, perhaps optimistically, they assumed manufacturers and retailers would resist going down this road:

*“I’m not sure exactly if there was a problem with the food or what it was, I just know there was a turn against it.” (Belfast WS1)*

*“It’s the same as the furore with GM crops and objecting and jeering from that point of view as well, when there was such a backlash against that, and you sort of associate the two together.” (Aberystwyth WS1)*

Some participants had read that small numbers of products from cloned animals may already have been introduced into the food chain in the USA (despite the industry having a voluntary moratorium) and this prompted others to question how we know it hasn’t already happened in this country:

*“There was a write-up about a farmer veterinarian in Kansas that is already putting meat on the counter and I have it printed here.” (Belfast WS1)*

### 6.11.4 Food Imports

Participants were also concerned about the possibility of food derived from clones being imported into the country – not just from the USA but from countries which might lack sufficient quality controls, such as third world countries.

The fact that an embryo from a cloned cow had been imported into the UK without the authorities being aware of it did little to address concerns that the UK’s own controls may be adequate. The embryo had been implanted into a surrogate mother on a UK farm who gave birth to a calf that has been named Dundee Paradise<sup>11</sup>.

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<sup>11</sup> Dundee Paradise is thought to be the first offspring of a clone to be produced commercially in the UK. See, for example, <http://news.bbc.co.uk/1/low/sci/tech/6249613.stm>

### 6.11.5 Safety

The major concern shared by everyone was whether the food derived from clones and their offspring would be safe for human consumption. A large number of participants had concerns that the cloning process might in some unspecified way result in food that was less safe compared to other methods of animal breeding:

*“If there was any bacteria...*

*...Mad cows disease, could there be anything in the meat that would affect humans...*

*...Yeah, and then create a new super bug kind of thing.” (Aberdeen WS1)*

This was fuelled by the BSE/vCJD crisis:

- the public were told for a long time that there was nothing to fear from eating beef (e.g. John Gummer feeding his daughter a beefburger)
- the recent suggestion that the dormancy period for vCJD might be 20 years or more confirmed most participants' view that any ill-effects might not be immediately obvious:

*“I don't see how you can say something is safe or unsafe after ten years. We've got vCJD which they think is from BSE - they think there may be a 25 year dormancy period. We've only had Dolly the sheep for twelve years so [ ] it's unproven but the dollar sign says, 'it's unproven so it's safe'.” (Aberystwyth WS2)*

*“The thing that would worry me is [something] like BSE. I mean they're saying that it can sit dormant in you for years, stuff you could have had five or maybe ten years ago. And then how do they know this isn't going to affect you the same way? How are they going to test it to see if it's going to happen? Ten to fifteen years down the line you could be talking about something coming from these things affecting humans.” (Belfast WS1)*

The idea that such food would be classified as a 'novel food' and therefore subject to additional safety assessments was only picked up by one or two participants:

*“One of the things I found reassuring in this country is that they're actually classing it as a novelty food, which has more strict rules and boundaries before it can be put on the food market than it does in other countries. And it takes a longer process to be accepted. I thought that was quite a good thing.” (Aberdeen WS2)*

Participants were not reassured by statements from the likes of the FDA that there was no evidence to show such food was unsafe. Such claims were met with a high degree of scepticism:

*“So it’s no good just telling me the components of the meat are okay, although I think that one of the tests said that one component in the cloned animal was below the standard.” (Aberdeen WS1)*

*“One of the websites I was looking at just said that the – well, they implied that the researchers in America were in some way linked to the producers so it was in their best interests to give positive results to profit.” (Belfast WS1)*

Some had noticed an earlier report from the French food safety agency<sup>12</sup> which seemed to throw doubt on the matter:

*“And then there was a report issued in France and I think it said that there wasn’t enough evidence to conclude either way, if it was safe or unsafe.” (Belfast WS2)*

There is a major mismatch between the methods used to assess food safety by regulatory authorities such as the FDA and EFSA and the public’s perception of what is required. The model of assessing food safety that participants intuitively assumed should be used was along the lines of a clinical drugs trial:

- food derived from clones would need to be tested over a period of several years before one could conclude it was safe to eat:

*“So if I was to take a new tablet or a drug, as whenever those people took it and they had a problem, they actually had a group of people that ingested that medicine and then from watching their reaction, eventually it comes for me to take that drug. But with food then, is it the case that they look at a paper where a scientist has written it, if they say it’s okay, so we eat it? Where is that stepping stone where humans are fed it for a certain amount of time so then we can say ‘well look, x amount of people have been eating cloned food for so many years and these are fine, they’ve now had children and their children are fine’. That is my concern.” (Aberystwyth WS2)*

- the minimum time period for such testing was considered to be anywhere from five to twenty years:

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<sup>12</sup> ‘Risks and Benefits related to livestock cloning applications’ AFSSA. Sept 05

*“Yes, [the] long term effect I would be worried about. So if they had somebody consuming that food for about ten years, then I think I would feel pretty safe after that if nothing happened to them.” (Belfast WS1)*

## 6.12 Theme 11: Money

A number of participants were concerned that the drive to develop animal cloning is largely profit motivated and this could result in the technique being introduced before all the problems have been ironed out:

*“More [money], that’s the only reason. You’ve got something that works, they want to change it, the only reason that farmers and people want to do it is to make more profit.” (Croydon WS1)*

*“I’d probably say it would be used in the private sector, big companies using it to make profit for producing special cows that are going to produce more milk and use it a bit more to do with money.” (Belfast WS1)*

Some also had concerns about the amount of tax payers’ money they assumed was being spent developing the technology:

*“Well it’s the taxpayers - we always end up paying for everything.” (Belfast WS1)*

In itself, the financial theme was not a major concern but the lack of any clear reason for cloning livestock left some participants feeling the only gain is a pecuniary one.

## 6.13 Theme 12: Controls and Regulations

This theme only came up in passing during the first workshop but became more of an issue during the second workshop. Initial reactions included:

- what controls were in place or should be in place:

*“Will it be controlled and who will limit it to what goes on? Who makes the choice?” (Aberdeen WS1)*

*“There have got to be measures in place that are going to tell you that it’s safe, you know. I understand that everybody says it’s safe but a clone is not the same to me because it’s not the same, is it? So what controls are in place and what are they, what is going to give me the peace of mind?” (Aberystwyth WS1)*

- whether our current laws are up to date and adequate
- who will be responsible for regulating animal cloning:



*“Who will select the animals to be cloned? Who’s to say that that animal is perfect?” (Aberdeen WS1)*

*“Who’s doing it and under what guidelines they’re doing it because you know, people are always going to get carried away and take things one step too far.” (Belfast WS1)*

There were particular concerns relating to imports into the UK of clones or embryos or semen and of food derived from clones; participants were worried that while the UK may have adequate controls, this might not apply to other countries.

As participants began to appreciate the implications of animal cloning for the human food chain, they began to question how this would be controlled and regulated. This theme is considered in greater detail in a later section (see 8.2.).

#### 6.14 Theme 13: Public Opinion

While it was recognised that people are often very wary of anything that is new and ‘out of the ordinary’, it was also widely acknowledged that the British public felt they had good cause to be concerned in the light of BSE/vCJD. Indeed, as noted above, some participants hoped food derived from clones would go the same way as GM food – that it would meet such strong consumer resistance that farmers and supermarkets would decide not to go down this route.

Others were more sceptical, feeling that public opinion is largely ignored and food derived from clones would arrive on the market. Interestingly, this was sometimes based on misinformation. The first of the next two quotes is from a participant who believed that GM food has been introduced into the UK without labelling and the second is from someone who incorrectly believed that irradiation of food has been widely introduced:

*“We’ve had no choice in the matter. They’ve just gone ahead and done it. The whole world, including this country, has agreed to it, we’ve had no choice in the matter. So now we’ve got genetically modified food in our food and they won’t even tell us which foods have got it in.” (Croydon WS1)*

*“It’s like with the radiation in food and things like that, it’s never seen is it and everybody has forgotten about that. But to preserve food, it’s radiated to stop it rotting and that bit was forgotten about and give it six months, nine times out of ten you’ll be buying it off the shelf as usual.” (Croydon WS1)*

Some hoped that the public would be allowed to have its say in the form of a referendum.

### 6.15 Theme 14: Consumer Choice

A paramount concern for everyone, irrespective of their views about animal cloning and whether clones and their offspring should end up in the food chain, was that the consumer should be able to exercise an informed choice.

The principal way in which this could be addressed was to ensure that all such foods were adequately labelled – not just food sold in shops but also from restaurants and fast food outlets:

*“So I reckon from the word go, this is such a serious thing that we should get the labelling sorted out. Anything on that supermarket shelf, if it is genetically cloned, it doesn’t matter if it’s cloned off a clone off a clone, let’s know about it. Then people have got the proper choice and they don’t feel robbed. Labelling is important to me.” (Aberystwyth WS1)*

This question is considered in more detail in a later section (see 8.3).

### 6.16 Theme 15: The Inevitability of Cloning

It was clear that many participants saw animal cloning (and the impact of this on the food chain) as an ‘unstoppable juggernaut’:

*“We seem to be jumping, running before we can walk.” (Croydon WS2)*

*“I’m not happy but I think if the people that be want it to happen, it will happen.” (Aberdeen WS1)*

The fact that matters were so advanced in the USA with the prospect of clones and their offspring entering the human food chain within the next few months, surprised many participants and confirmed their fears that it was just around the corner:

*“I think we’re going to rush into it. Once the green light has been given, we’ll rush into it.” (Croydon WS2)*

*“I think they’re [the USA] well in advance of us because we’re nowhere near that stage just now. But with them leading, we’ll probably catch up quick as well.” (Aberdeen WS2)*

For some, there was a resigned acceptance that this was going to come about – these participants felt impotent and unable to influence the outcome.

## 6.17 Theme 16: Can We Trust Them?

This theme comes at the end because it relates to most of the other themes already discussed in this section.

Many participants raised the issue ‘can we trust them?’ In some cases, it is clear who ‘they’ are but in others, participants had no clear idea who ‘they’ were. Indeed, this seemed to be part of the problem – who are these shadowy figures that they know nothing about who seem to be responsible for all this?

*“So do we trust the people who are doing it?” (Croydon WS1)*

*“We’re only told what they want to tell us.” (Croydon WS1)*

Trust was a major concern at all locations but was particularly acute in Belfast. Participants in the Belfast workshops displayed a considerable mistrust/suspicion of the authorities/government and there was more of an ‘us and them’ mindset during workshop activities; participants seemed less willing to engage in discussions with the researchers and the participants from the FSA.

Some of the causes of mistrust that were specific to animal cloning and were raised across the sample included:

- a concern that clones and their offspring may already be in our food (this was fuelled by suggestions that this has already happened in the US):

*“Do we actually know how much animal cloning is going on?...”*

*...No, definitely not...*

*...Are we ever going to know? The meat that you eat now could be cloned...*

*...They’re never going to tell us if it all goes wrong.” (Aberdeen WS1)*

- contradictory information (especially on the Internet) which makes it difficult for people to form a view:

*“There were different websites that gave different results. They’re still not definite about life expectancy, are they? And some said it’s been proved it had no effect, some said it might and some said it’s been proved that it definitely does affect, so it just depends where you read, doesn’t it?” (Aberystwyth WS2)*

- constantly shifting advice in terms of what is good/bad for us:

*“The thing that worries me is the amount of times you’re told, maybe say 20 years ago, it’s okay to have x amount of coffee or eat x amount of beef. It seems to be at least once a month there’s a different food that was seemingly okay for people to eat and now it’s not okay because it causes either cancer or loads of different things. So would that change? If it suddenly became okay, would it change again in maybe 10-15 years time that ‘okay, we’ve found this out now’? Why wasn’t it found out before the stuff was put on the market?” (Aberdeen WS2)*

Participants had reason to question the trustworthiness of all the major players they thought would be involved in animal cloning including scientists, the Government, the FSA, the research agency and commercial organisations.

### 6.17.1 Scientists

As has been noted elsewhere in this report, some people had an inherent mistrust of scientists; conversely, others had a positive image (see Theme 5: Science and Research).

The fact that cloning had, in fact, been going on for some years in one form or another and yet the public were only just beginning to hear about it, often fuelled suspicions that scientists were trying to keep their work secret. This made people even more suspicious:

*“Given that there’s already been ten years or more on animal cloning, there’s a strong possibility that human cloning is going on behind the scenes as well.” (Aberdeen WS1)*

*“You think well, if they’ve done all this and we know nothing about it and here I am learning all this, when obviously it’s been going on for quite a considerable time, yeah, what next?” (Aberystwyth WS1)*

There was also concern that the scientists were moving ahead too fast:

*“You feel they are doing it without knowing what the consequences are. It’s like, you know, they have an infestation of something so they introduce a new species to kill it, which it does and then it goes on to eat half the natural wildlife...*

*... Yeah, absolutely...*

*... Or like, you know, rabbits and what have you. So they are doing this but they don’t know what the outcome is. If it becomes a widespread policy, is*

*it going to affect anything else? Like GM crops, it was the same argument with GM crops, wasn't it?" (Aberystwyth WS1)*

*"People are just as oblivious to it as I was. It seems to have been going for such a long time and how little the general public, we know..."*

***...And do you find that worrying or do you think that's inevitable or what?...***

*...Well a bit worrying yeah, because what's going to happen and are they going to stick it into the food chain and keep us in the dark, and just let us know if they want us to know?" (Aberystwyth WS2)*

### 6.17.2 Government

For some participants, the Government was less trustworthy than the scientists:

*"I definitely would trust the scientists more than I would trust a politician. Politicians are often put in jobs that they know nothing about. They happen to be well educated and they pick it up as they go along, how scary is that? A scientist presumably is an expert in his subject and you are more likely to trust them." (Aberystwyth WS1)*

As with so many other things, participants questioned the Government's role in animal cloning and assumed it had some hidden agenda of its own:

*"Well, we think it's backed by government and that they're not really going to come out and tell us." (Belfast WS1)*

*"I don't trust the Government on anything." (Belfast WS1)*

People also questioned the Government's competence – the fact that *Dundee Paradise* had been brought into the country without the Government's knowledge (see 6.11.4.) did little to quell concerns about how easy it would be to control and regulate this area.

### 6.17.3 Food Standards Agency

Most participants had limited awareness of the FSA or its role. Where opinions were expressed, they were mixed:

*"The FSA, which we hopefully have faith in, have been reprimanded twice, as you will probably know, at least twice for two issues of not taking the advice from scientific experts, committees. One being on genetically modified crops and another on specialist food additives and their advice was ignored and because of that they got a slap on the wrist. But if we can't trust the FSA to be 100% sure before the food goes on the shelves, then we have a problem." (Belfast WS2)*

*“I don’t know. I mean maybe I’m a bit too trusting but I find it quite reassuring to read about the Food Standards Agency and their involvement and the fact the amount of research they’re doing before, you know, at the moment. I find that quite reassuring.” (Aberystwyth WS2)*

#### 6.17.4 Creative Research

A few participants during breakout sessions wondered out loud whether the research team were being completely open and honest with the information they were sharing with them. In part, this stemmed from the fact that during the first workshop participants were encouraged to go and do their own research rather than having all of their questions answered by the researchers:

*“He’s [the moderator] not telling you everything, there are some things he can’t tell you I think, when some people were asking some questions...*

*...He said that because some of that we will find out for ourselves...*

*...Oh, so why isn’t he saying?” (Aberdeen WS1)*

#### 6.17.5 Business

Doubts were expressed about the motives of biotech companies, farmers, food manufacturers and supermarkets:

*“They’re [food manufacturers] not going to advertise on their packaging.” (Belfast WS1)*

*“I just get the impression from the media recently that the supermarkets have their set prices and put a lot of pressure on the suppliers, so the prices go down and it has an impact on how animals are treated. I think it all comes from the top of big businesses.” (Belfast WS1)*

*“The whole thing could be hijacked by commercial businesses.” (Belfast WS1)*

*“But you can see dollar signs. I’ve got nothing about people making money, fair enough, but I mean it came across very – as x was saying – you’ve taken it from a scientific point of view. In America, it is very money driven.” (Aberystwyth WS2)*

# 7 Eating Food Derived from Clones and their Offspring

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## 7.1 Introduction

Over the course of the workshops, participants' views were tracked to see whether they would be prepared to buy and eat food derived from clones and their offspring. This was done using the self-completion questionnaires at the end of the first workshop and at the beginning and end of the second workshop. During the second workshop participants were also asked to divide themselves into a number of breakout groups, based on their views on this matter.

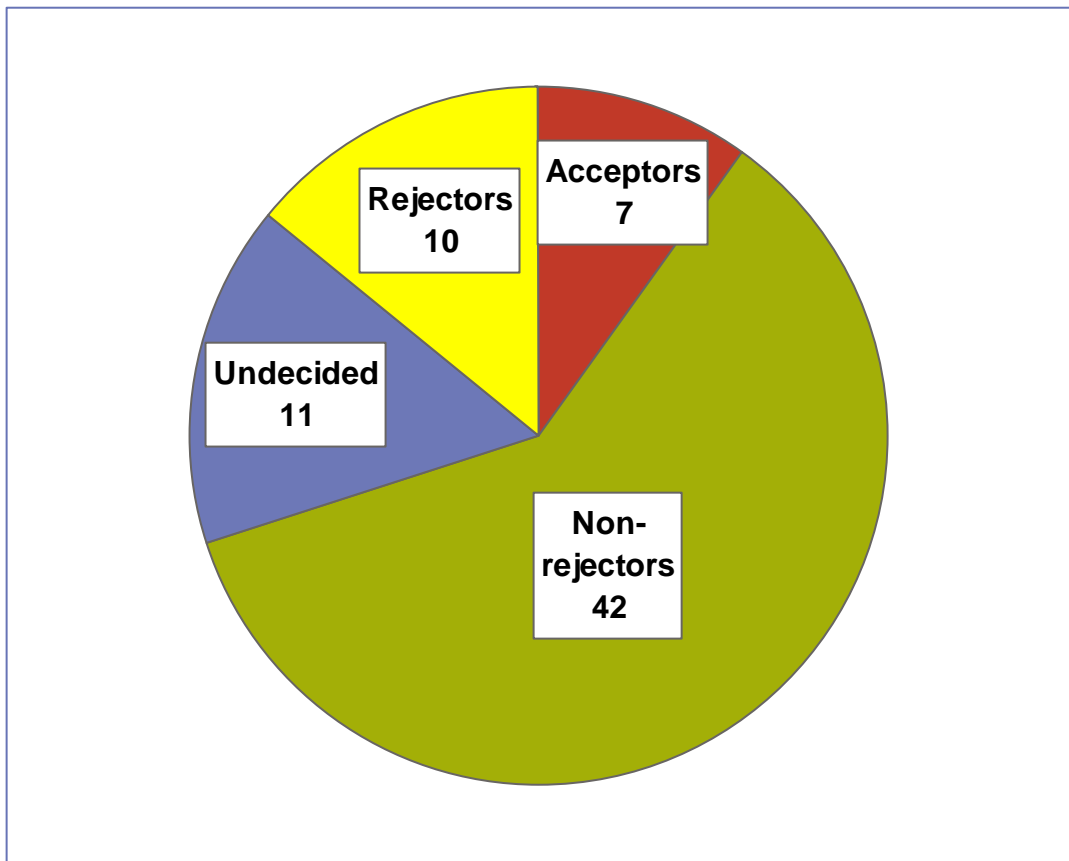
## 7.2 Findings from the Self-Completion Questionnaires

Participants can be divided into four categories based on their replies on the self-completion questionnaires:

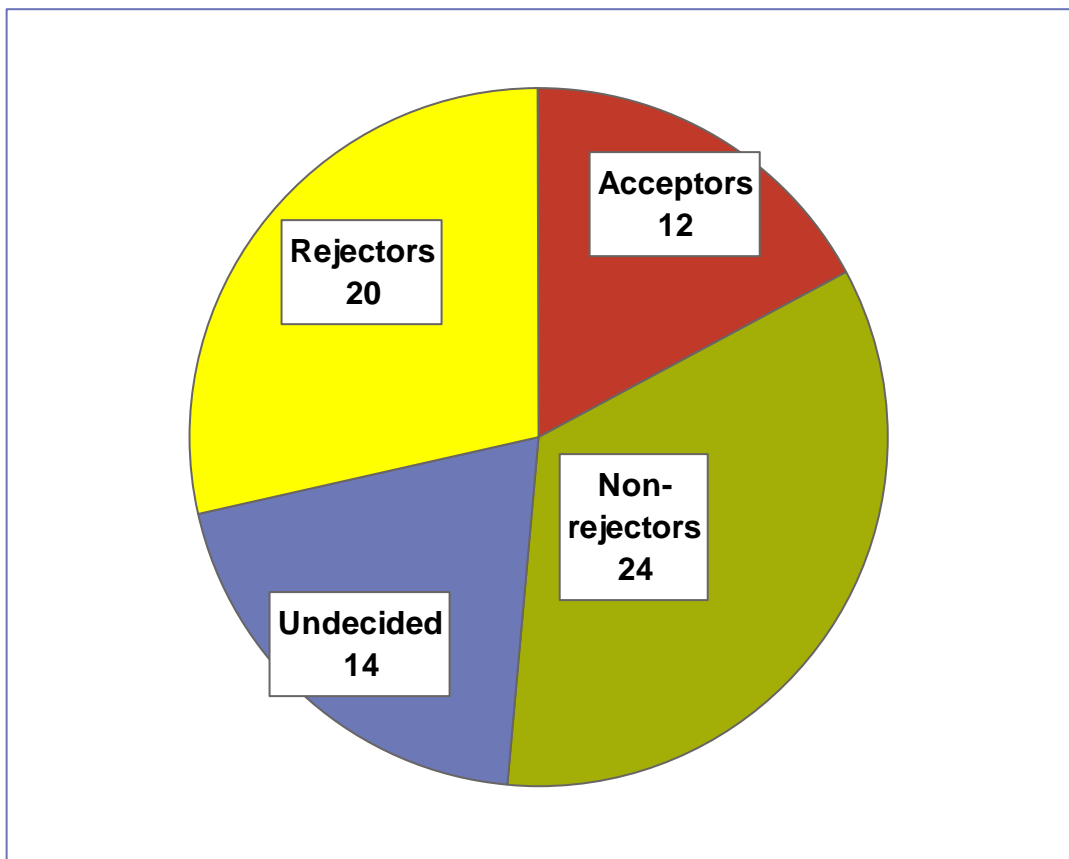
- **Adopters:** Those who would buy and eat such food
- **Non-rejectors:** Those who would consider doing so but only after finding out more about it
- **Undecided:** Those who could not decide what they would do
- **Rejectors:** Those who would never buy or eat such food.

When participants were first asked their views, at the end of the first workshop, most adopted a relatively neutral position by either stating they did not rule out the possibility but they would want to find out more about it first or by stating they could not decide what they would do (see Figure 3). By the time they returned for the second workshop having read the fact sheets and carried out their own research, their views had begun to polarise with a small number being prepared to eat such food and a larger group of Rejectors (see Figure 4). At the end of this workshop, there were a large group of Rejectors (33) and a smaller group of Acceptors (15). Figure 5 suggests that when one takes into account the Non-rejectors and the Undecided, the Rejectors represent a minority. However, as the opinions of Non-rejectors and the Undecided were explored, it was clear they were much closer to the Rejectors than they were to the Acceptors, something that participants themselves acknowledged.

**Figure 3: Propensity to Buy/Eat Food Derived from Clones and their Offspring:  
End of Workshop 1 (n=70)**

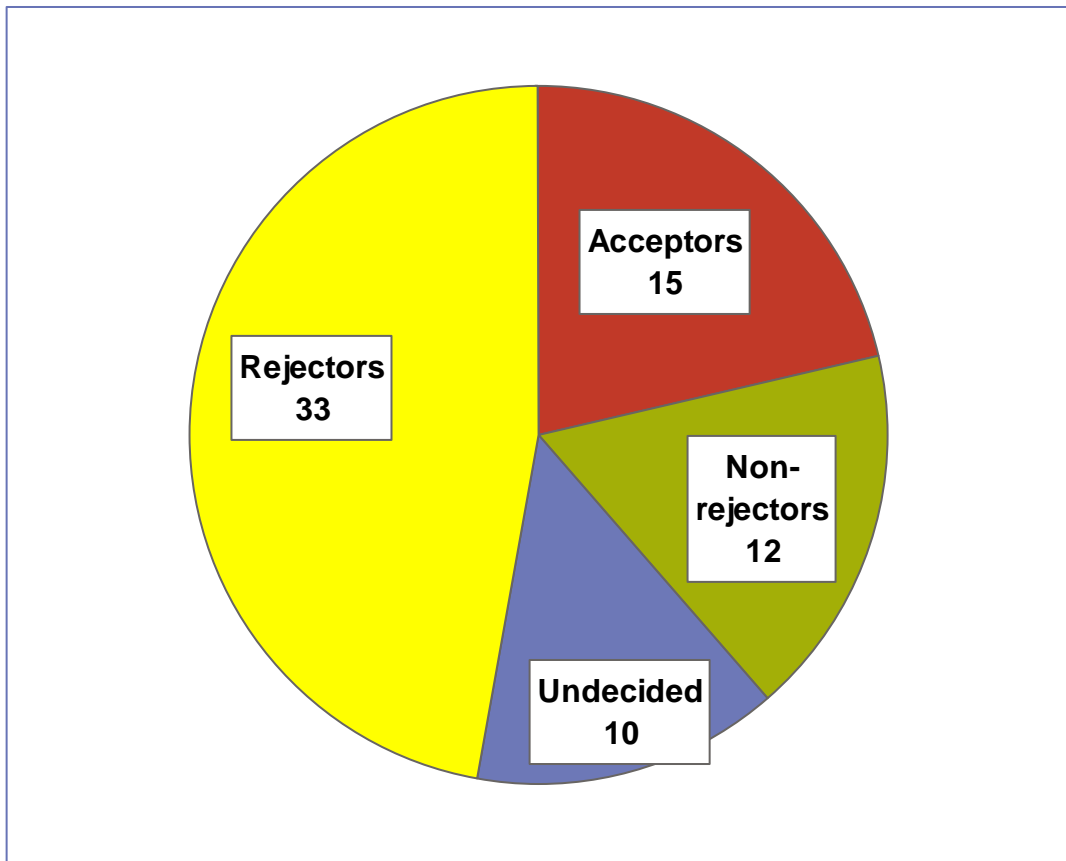


**Figure 4: Propensity to Buy/Eat Food Derived from Clones and their Offspring:  
Start of Workshop 2 (n=70)**





**Figure 5: Propensity to Buy/Eat Food Derived from Clones and their Offspring: End of Workshop 2 (n=70)**

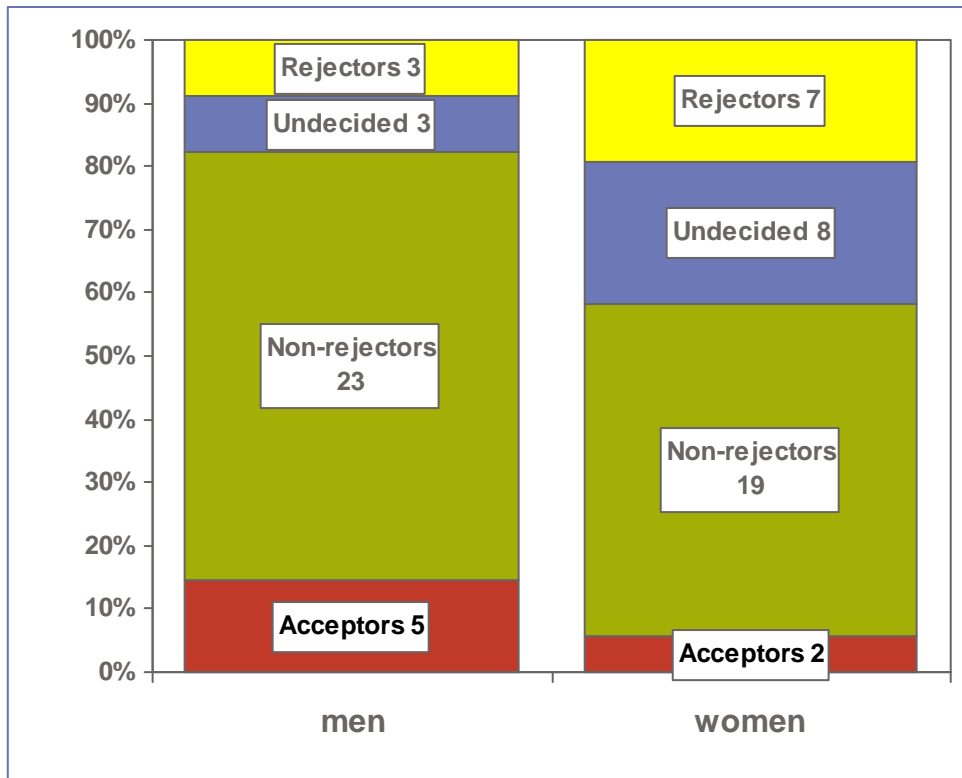


As before, when considering levels of knowledge and concern, there was a noticeable gender divide in propensity to buy/eat such food. The women started off by adopting a more cautious approach, more of them were either Undecided or Rejectors compared to the men, and by the end of the second workshop, most ended up as Rejectors.

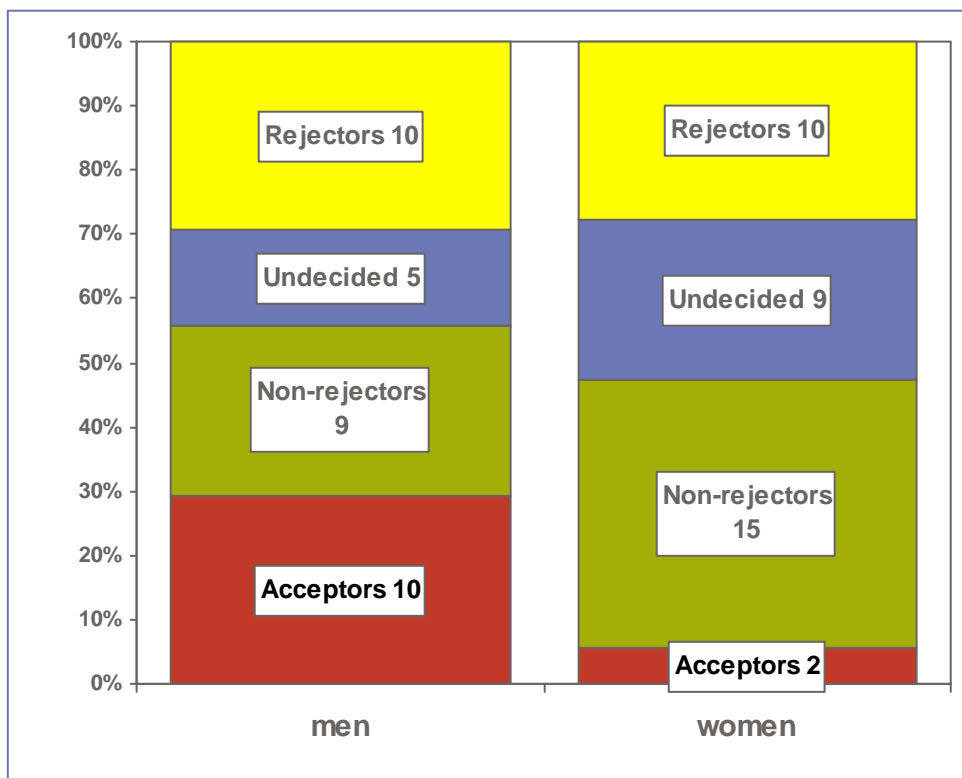
In contrast, the men often started out as Non-rejectors. Although the number of men who ended up as Rejectors increased from 3 to 11, the number of Acceptors also increased from 5 to 10. A majority of the men (19 out of 34) ended up either as Acceptors or Non-rejectors which contrasts with a majority of the women (23 out of 35) who ended up as Rejectors (see Figures 6 - 8).

Given that women still tend to be the main food shoppers, one of the implications of this difference is how it is likely to impact on buying behaviour should food derived from clones and their offspring appear on supermarket shelves.

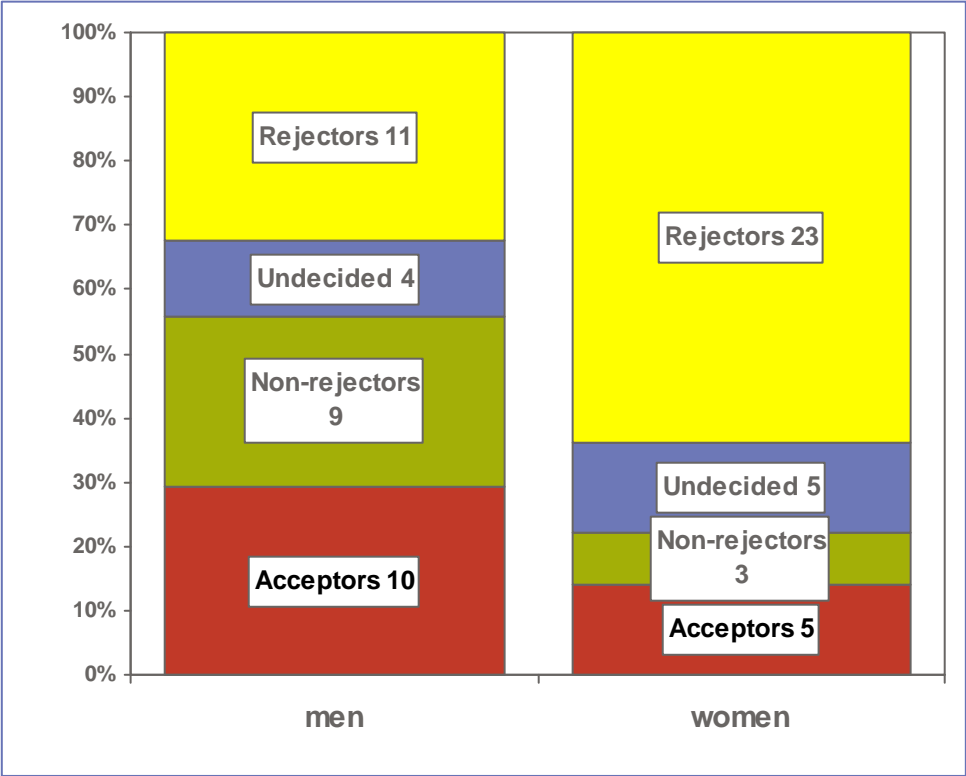
**Figure 6: Gender Differences in Propensity to Buy/Eat Food Derived from Clones and their Offspring: End of Workshop 1 (n=70)**



**Figure 7: Gender Differences in Propensity to Buy/Eat Food Derived from Clones and their Offspring: Start of Workshop 2 (n=70)**



**Figure 8: Gender Differences in Propensity to Buy/Eat Food Derived from Clones and their Offspring: End of Workshop 2 (n=70)**



**7.3 Breakout Groups**

During the second workshop participants were divided into breakout groups based on their propensity to buy and/or eat food derived from clones and their offspring. This was done on the basis of a show of hands (the self-completion questionnaires were completed on an individual basis with the results not being shared). This gave rise to somewhat different groupings as shown below in Figure 9.

Participants were divided into breakout groups early on during the second workshop, where the size of the groups might have been expected to reflect the self ratings obtained at the start of Workshop 2. By and large they did; the main differences were that some individuals who had rated themselves on the self-completion questionnaire as Non-rejectors or as Don't Knows opted to be either Acceptors or Rejectors when invited to join a group by a show of hands. In fact, the size of the breakout groups was closer to the size of the groups produced by the self ratings at the end of the workshop:

- 15 Acceptors, 36 Rejectors and 19 Undecided/Non-rejectors.

**Figure 9: Breakout Groups**

	Aberdeen	Aberystwyth	Belfast	Croydon	Total
Acceptors	6	3	2	4	15
Don't Know	8	4	7	0	19
Rejectors	4	10	9	13	36

**7.4 Arguments For and Against Buying/Eating Food Derived from Clones and their Offspring**

In their respective breakout groups, Acceptors and Rejectors were encouraged to discuss and agree the arguments they would use to defend their position and to counter the arguments they expected to hear from the other groups. Those in the Undecided groups were encouraged to identify the issues that were important to them and the issues where they felt they needed further information in order to help them make up their minds. Each breakout group then drew up a presentation of their arguments and issues to present back to everyone else.

Their arguments have been organised according to the set of themes described earlier in this report (see Section 6).

**7.4.1 Arguments in Favour of Buying/Eating Food Derived from Clones and their Offspring**

The main thrust of the arguments related to three themes.

- 1. **Food** (theme 10)

Participants believed that animal cloning has the potential to offer better quality food. By carefully selecting the donor animals, the resulting offspring would be more likely to be disease free and to yield better quality produce:

***“Can I just check ‘better quality meat’, why would it be better quality?...”***

*...Because generally with diseases you’d be eliminating them to a certain extent because you’re taking the best so you’d do away with that...*

***...So one of the benefits of cloning is that by selecting the right animal in the first place, you end up with a better quality product than you might otherwise?...***

*...Yeah.” (Aberdeen WS2)*

*“The quality of the meat will be enhanced, better cuts, better quality.” (Belfast WS2)*

Other food related arguments were associated with the ability to produce larger volumes of higher quality food at reduced prices and to overcome food shortages including those caused by global warming:

*“Reduced cost which would make it more affordable.” (Belfast WS2)*

*“Obviously, they would be churning it out a lot quicker and going through the cycles. It may be that meat will become cheaper. On the other side of that, if it is cloned, or if it’s not cloned, would one become higher priced because if it’s quicker [to produce] would the non-cloned meat become more expensive? Like free range or organic, would you end up paying more for non-cloned meat?” (Aberdeen WS2)*

*“It may be necessary to breed animals that can thrive in higher temperatures as the effects of global warming take effect.” (Croydon WS2)*

Comparisons were also drawn between eating food derived from clones and their offspring and other types of food. For example, if people happily eat fruit and vegetables which have been produced through cloning (naturally, such as strawberries, or through horticultural practices), why should they be worried about eating animal food products produced in this way? In a similar vein, some felt that if people are willing to eat processed foods containing lots of additives, why would they get overly concerned about food derived from clones?:

*“Okay, the other thing for us was processed foods. How many of us eat processed foods and you don’t read the labels and you don’t see what’s in there, you know additives, e numbers and they’re probably more bad for you, they’re stuffed with things that are not natural?” (Aberystwyth WS2)*

Likewise, some felt that SCNT was less likely than some of the other ARTs to involve the introduction of chemicals and hormones which might get carried through to the food:

*“There’s no chemicals, there is nothing, in itself it’s quite a natural process. I know it’s a big intervention but there is nothing added or taken away, it’s replaced with just new DNA and we felt it was more of a natural process. If it was a sheep being injected with hormones to bring on, so they produce certain times of the year, that would bother me because there’s something added. With cloning, I can’t see the issue myself because there’s nothing actually added to it.” (Aberystwyth WS2)*

In some cases, attitudes were shaped by a degree of indifference on the grounds they had been meat eaters all their life without ever questioning in any detail what this meant in terms of animal welfare or food processing, and they did not feel they would change if food derived from clones was to appear on the market.

## **2. Controls and regulations (theme 12)**

There was a clear difference between Acceptors and the other breakout groups with regard to their views on controls and regulations. They had greater confidence that such food would be subject to strict controls. For example, the Croydon breakout group spoke about the fact that nothing is ever 100% safe but felt that food derived from clones and their offspring would be subject to strict levels of control and monitoring such that, if anything, such food would be safer than other food:

*“We felt there are very strict controls, particularly in the United Kingdom, that’s considered to have the severest controls, the best controls in the world, and there’s no reason why a cloned animal is going to be treated any different.” (Croydon WS2)*

Similarly in Aberdeen, participants were reassured by the fact that such food will be treated as ‘novel food’ which they interpreted to mean it will be subject to more thorough checks so there would be less likelihood of something slipping through.

Interestingly, Acceptors felt that since animal cloning is already taking off elsewhere in the world, rather than fighting against the inevitable, it made sense for the UK to embrace the technology since this would put us in a stronger position and give us, as a country, more control over events:

*“I think there is, in terms of the competition and our place in the world, there is something to be said for making sure that we, as a nation, pursue this technology because other countries will.” (Croydon WS2)*

Some of them also took the view that animal cloning is coming and they have the choice of ‘leading, following or getting out of the way’:

*“Things have to go forward; if we all live in the dark ages then nothing would ever be accomplished.” (Belfast WS2)*

Acceptors also made occasional references to the importance of consumer choice. By and large, they assumed any such food would be labelled as such, thereby allowing consumers to exercise a choice.

### 3. **Animal welfare** (theme 9).

These participants took some comfort from the fact that any clones that are born with defects or abnormalities typically do not survive and so are unlikely to find their way into the food chain. They were not indifferent to animal suffering but tended to take the view that as the technology advances it should become more efficient and there should be fewer failures and less suffering.

Acceptors also sometimes made reference to the perceived benefits of animal cloning, sometimes making references to how cloning is different to other technologies used either for livestock breeding or food production:

*“It’s not like genetic engineering. It’s not changing the genetic material, it’s just transferring the genetic material from a cell into an empty egg. So we cannot see that there is any reason why the meat produced from an animal that’s been bred in this way, that’s going to be any different to the meat from an animal bred in a more conventional fashion.” (Croydon WS2)*

*“If the DNA is perfect and the meat is perfect, why have we got a problem? There shouldn’t be any.” (Belfast WS2)*

*“We also noted that the conventional kind of breeding is not efficient. Cloning is potentially more efficient so therefore it’s going to be beneficial.” (Croydon WS2)*

#### 7.4.2 Arguments Against Buying/Eating Food Derived from Clones and their Offspring

Rejectors put forward a wider range of arguments although once again, three themes were mentioned most frequently.

##### 1. **Food** (theme 10)

The major concern for Rejectors, despite the conclusions reached by authorities such as the FDA, was that food derived from clones and their offspring was potentially

unsafe. Their views were shaped to a considerable extent by what happened in relation to BSE and vCJD.

The high cloning failure rate and the large number of clones with defects implied for Rejectors that any resulting food may be unsafe:

*“Only 1-2% of them do survive and so many of them have got abnormalities that there’s something uncertain about the health of those animals and what we are prepared to eat and put in our food chain.”  
(Croydon WS2)*

They were also concerned that the cloning process could somehow introduce new diseases. In their view, it will only be possible to come to a decision about the safety of such food after several years of testing and, until such testing has been carried out to their satisfaction, they were not prepared to risk eating it:

*“At this point, I wouldn’t eat a clone. In twenty years time when we really know the outcome of it, then I might change my mind...”*

*...I’m the same. I wouldn’t personally eat it, I wouldn’t let my children eat it. Let the scientists try it and let their children try it, for twenty years, see how they get along. If it comes up perfect, we’ll have it.” (Aberdeen WS2)*

*“It’s okay to look at the food and say, ‘well, it’s the same’, but we just don’t know in twenty years time if we’re really going to regret that.” (Croydon WS2)*

They gave short shrift to the idea that animal cloning is needed because of food shortages:

*“I think at the last figure, \$100 billion worth of food was wasted in one year in the United States. If we halve that, that’s 50 million which equates to feeding every member of Africa that’s starving for five to seven years. Last year in the UK, we wasted £8.9 billion which is enough to feed all of the starving people of the world for 240 days.” (Belfast WS2)*

*“People say we need more meat, we need more milk to feed the growing population. Well actually, we don’t. We’ve got food, we’ve got good technology for producing food.” (Croydon WS2)*



## 2. **Animal suffering** (theme 9)

Animal suffering was a major issue among Rejectors and this related to all the animals involved in the process, including the donor, the clone and the surrogate mother. For some, it was the combination of their fears about food safety along with animal suffering that led them to reject the idea. For others, animal welfare issues were paramount, to the extent that although they did not have particular food safety concerns they would not want to buy such food because of what they perceived to be an unacceptably high level of animal suffering:

*“I mean, I don’t personally think that cloned meat is going to be dangerous anyway, I’ve got other issues. I’ve got more ethical issues and moral issues rather than health and safety issues.” (Aberystwyth WS2)*

## 3. **Consumer Choice** (theme 14)

When it came to consumer choice, their main concern was that consumers will not have any choice; again, this was in marked contrast to the Acceptors. Rejectors clearly had doubts that such food would be labelled and, even if it was, they questioned whether they could trust such labelling. They wondered how widespread any labelling system would be – would it cover restaurants, for example? They doubted that any system could be enforced and they were unsure how practical it would prove to be to have cloned animals kept separate from uncloned animals in the food chain.

Rejectors were also characterised by a marked lack of trust of everyone involved in animal cloning:

*“Even when it does get into our food chain, it won’t be correctly marked.” (Belfast WS2)*

*“If there is going to be genetically modified food coming into the food chain, will we know about it?” (Aberystwyth WS2)*

*“We just don’t believe what we’re being told. We’re very dubious about the information that we’re supplied [with] and feel that we’re given the information that they want us to have rather than what we need to know.” (Croydon WS2)*

Some Rejectors wondered whether the use of animal cloning for food production was, in fact, a *fait accompli* and that their views would not be listened to. Some even

questioned why this consultation exercise was being carried out and came to the conclusion that the Government is keen to allow it to happen.

They were also more likely to:

- question whether animal cloning is morally acceptable and express concerns about human cloning
- focus on potentially negative consequences of cloning (e.g. narrowing of the gene pool or passing on of undesirable as well as desired characteristics)
- acknowledge the possibility of medical benefits being derived from cloning while also point to unacceptable outcomes:

*“Already in England, the embryo that’s produced is 95% human and the other 5% is cow/rabbit. So when they talk about cloning, it’s a slippery slope.” (Belfast WS2)*

- express concerns that the technology is being driven purely by a profit motive
- express doubts about the control and regulation of cloning and the production of food derived from clones including the control of imports into the UK from overseas
- and come back to the question of why we need to clone in the first place.

### 7.4.3 Views of the Undecided

These participants also put forward a wide range of arguments. Again, there were three issues which seemed central to their position. Although they had described themselves as Undecided, their arguments were often closer to those of Rejectors. Indeed, in Aberdeen, two members of the Undecided breakout group decided to join the Rejector group half way through the workshop. The main difference between the two groups seemed to lie in the strength of conviction rather than the issues they held.

#### 1. **Food** (theme 10)

Although some of them admitted that it was difficult to see what the objections were to eating food derived from clones and their offspring, they also felt there was no point in taking the risk and preferred to take a ‘wait and see’ approach:

*“And then logically, we couldn’t actually see, we are not sure that it’s harmful. Part of us says there is no problem. I mean, I can see the logic in how you feed sheep’s brains to a cow and it’s not right feeding ruminants with sheep’s brains. But we couldn’t actually in the science see how genetically you can ingest bad genes or whatever, you can’t get it.” (Aberystwyth WS2)*

*“We need to know for years to come, this isn’t like a short term thing, really like, 10-20 years of research into this because we just couldn’t get around how they can tell when it’s safe or not, until those extensive tests have been done.” (Belfast WS2)*

The Undecided in Aberystwyth felt that they needed more information in the form of independent research that had been published in peer reviewed journals before they would feel comfortable with the idea of eating such food:

*“What we want to see as well, is some more good data and we want it peer reviewed by other scientists and preferably independent from agri-business because a lot of this work has been sponsored. A lot of the work, you find it’s sponsored by people like Monsanto and other people saying good things about cloning. On that radio programme, it was basically people with a vested interest. What we want is proper independent scientific data and more of it.” (Aberystwyth WS2)*

However, when it was put to them that the FDA and EFSA recommendations were based on such a body of work, they were unconvinced because they had in mind a different benchmark, specifically, controlled trials where such food is consumed over a long period of time:

*“No one’s actually eaten it yet. No one has actually eaten it yet, that’s the thing...”*

*...And then go away for a few years after they’ve eaten it to see what happens.” (Aberystwyth WS2)*

The Undecided also questioned whether the food would actually be any better quality as they felt this is as much down to environmental factors as it is genetics. Like the Rejectors, they also challenged the view that cloning was being introduced to prevent food shortages:

*“Is it not more about what the animals eat during their lifetime that makes it better quality rather than the genetics, where it came from?” (Belfast WS2)*

*“It was an article and basically, they’re saying that there’s 10,000 plus dairy cattle were culled to stem production. But with a 10% success rate*

*[with cloning] why were they culling 10,000 cattle? I'm not saying it's in this country but it's happening." (Aberdeen WS2)*

## **2. Possible benefits and negative consequences** (themes 3 and 4)

The Undecided were prepared to acknowledge that cloning might offer possible benefits but they were equally concerned that there may be (unknown) negative consequences. For example, in Aberdeen they acknowledged that a bull that was immune to a particular disease had been cloned and the immunity had been passed on to the clone. They also felt that animal cloning could be used to protect endangered species and that it might offer medical benefits but they were worried that accidents might occur during the cloning process and these might result in the creation of new diseases. One of the issues they raised was that one cannot know the unknowable - there is always the possibility that cloning could result in unknown negative consequences and since it seems to offer relatively few benefits, they were not convinced it was worth doing.

One participant raised an interesting argument that whereas other forms of ART allow for offspring that have new, improved traits, cloning means that breeders are restricting themselves to the *status quo* so, in the long term, cloning may offer fewer benefits than other breeding methods.

## **3. Animal welfare** (theme 9)

As with the Acceptors and Rejectors, the Undecided acknowledged that they had strong reservations about the use of cloning because of animal welfare concerns. The Aberdeen breakout group called for more work to be done in this area and suggested that the FSA should work closely with scientists and animal welfare experts to collect the evidence that would address their concerns:

*"I thought for that - put animal welfare [experts], the FSA and scientists together for about a 20 year period so you've got the offspring, offspring, offspring and then each of them will come up with their own conclusions, and then we can make an informed decision. So put the three [together] - animal welfare, FSA and scientists - so you're not just getting the one view, you're getting the whole picture." (Aberdeen WS2)*

Other themes that were sometimes raised by the Undecided included:

- Why clone in the first place?

- Can we trust them?
- Will there be adequate controls and regulations?
- Is it driven by profit motives?
- Will we be able to exercise any choice?

## 8 How Food Derived from Clones and their Offspring might be Introduced into the Food Chain

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### 8.1 Introduction

Towards the end of the second workshop, participants were asked to imagine a scenario in which the EU decided that food derived from clones and their offspring was safe to eat and, as a result, such food began to appear on sale in the UK. Leaving aside their personal views on whether this was something with which they would agree, they were asked to discuss and debate how this should be done.

Working in their same breakout groups, they were asked to consider four key questions:

1. Should there be special regulations and controls?
2. If regulation and control is needed, what form should this take?
3. What could be done to enable consumers to make an informed choice?
4. What role, if any, should be played by the FSA?

Although each breakout group had a different view on the desirability of buying and/or eating such food, there was a high level of agreement in the answers given to these four questions.

### 8.2 Regulations and Controls

There was universal agreement that there should be regulations and controls in place before food derived from clones and their offspring is allowed to go on sale. While it was impossible for participants to decide if existing regulations would be adequate due to a complete lack of awareness of what these cover, nevertheless, there was a consensus in terms of what participants believed was needed, irrespective of how they felt about animal cloning.

Participants wanted to see regulations and controls in place that covered everything 'from source to shelf' and addressed both animal welfare and human health issues. In other words, they wanted to go beyond an assessment of the safety of the food and to include controls relating to the use of animal cloning as a method of animal livestock breeding.

There was a call for anyone involved in animal cloning (labs, livestock breeders, farmers) to be licensed:

*“One of the things that we’ve come up with is maybe only certain people should be allowed to do it with a licence. Then you could have, you know as you were saying, it would be traced back to this licence and if it’s not there, the empowering bodies...”*

**...So one option might be rather than any farmer can produce clones, maybe we say you have to be licensed before you are allowed to do it and in order to get a licence you need to meet certain...**

*...Not only for meat but for milk as well. Only certain dairy farms would be allowed to produce cloned milk and it should be labelled, you know, like organic....*

*...It’s the same as using selective breeding. It will be selected farmers and you have the farmers that do that...*

*...From an audit point of view as well, they actually do carry out audits and approvals can be taken away, so therefore farmers with this licensing thing, again their approvals could be taken away. They won’t be able to practise in that field...*

**...So you need to be audited and approved to carry on doing what you are doing and if you are found to be...**

*...Faulty in anyway then you could be taken off that list.” (Aberdeen WS2)*

*“When you’ve got labs preparing these sorts of embryos and what not, that they have to be monitored as well. They have to have their own procedures in place...”*

**...So the organisations that are producing clones need to be regulated, licensed maybe?...**

*...Yes, licensed...*

*...Yeah, I put licensing down, yeah.” (Aberystwyth WS2)*

*“We thought the farmers should be licensed to actually carry out the surrogacy.” (Croydon WS2)*

*“No average farmer should be allowed to clone. [ ]There should maybe be a select few farms in the whole country with maybe a laboratory or something, like a small testing lab, so they can do it on site. That is the only way we can see around it. So there’s good government control then within those farms, those few farms.” (Aberystwyth WS2)*

In essence, licence holders should work to a set of agreed procedures and standards. These should include:

- a ban on any form of GM:

*“So there would be no genetic modification permitted above whatever goes on to actually facilitate the cloning process.” (Croydon WS2)*

- restrictions on the number of animals being cloned in order to keep a good balance and to avoid narrowing the gene pool more than is necessary
- possible restrictions on cloning from clones if there is any possibility that this could result in higher rates of defects and unhealthy or abnormal offspring:

*“So should there be a clone, you breed a bull that’s really good, so you take a clone of it, that bull dies so then you take another clone of it, and another clone of it. Should you allow cloning of cloning of cloning of cloning?” (Croydon WS2)*

- only healthy clones to be permitted to enter into any food chain i.e. deformed/unhealthy clones should not be used for animal feed (participants wanted to avoid the possibility of another BSE scare)
- possibly restricting farmers from owning mixed herds (to ensure separation of carcasses and other produce such as milk)
- strict separation at the abattoir:

*“The next thing we would like to see is strict monitoring, for example in the abattoir. We would want some sort of, something set in the abattoir that you could see there was no chance of mixing. Perhaps if you had, well should we say normally bred cattle going in, that there was some sort of strict control in place so you actually knew that you were getting what they were saying.” (Aberystwyth WS2)*

There was a call for traceability (e.g. all clones and their offspring to be ‘chipped’) analogous to quality control procedures widely adopted in manufacturing industry:

*“They do things like tracing back material used in components that go offshore in submarines and so forth and so by the same token they could trace back the origin to see if there were any genetic defects and so on and so forth.” (Aberdeen WS2)*

It was also suggested that there should be a database of all operators and, possibly, clones and their offspring. This would include the results of inspections and audits (see below) as well as enabling the whereabouts of individual animals to be tracked:



*“There’s a food company in the States, [ ] they want to put all their cloned material on a database and track it through to the supermarket from the farms.” (Aberystwyth WS2)*

*“From that database basically, people can be in a situation whereby they can go in and look at this information or in turn they know that it’s there and the governing body of this, the FSA, would be in a position that they could check up on these people and subsequently report back on the countries that are not following the regulations as they should be.” (Aberdeen WS2)*

Another common response to this issue was the need for the regulations and controls to be monitored and enforced. Participants wanted to see spot checks, regular inspections and audits – with the ultimate sanction of an operator having their licence removed if they fail to operate to the required standards:

*“They can employ scientists to go into the laboratories and make sure they adhere to legislation and are doing what they are supposed to be doing and messing with what they are supposed to be messing with. If you’ve got different agencies involved, the one end of the street does not know what’s happening at the other. People can get up to hanky panky - they can get the private enterprise you know creeping in on the situation. If they think they are going to make £25,000 a time, you might get private laboratories setting up trying to make money so I think the FSA should be expanding to the point where they’ve got total control of everything from start to finish.” (Aberystwyth WS2)*

Given the concerns that had been raised earlier, it is not surprising that participants wanted the regulations and controls to apply not just to home produced clones and food derived from them but to all imports of the same. Ideally, this would include the ability to carry out inspections of suppliers in their country of origin:

*“The FSA should also have a really strict kind of thing on import and export of the meat and they should be able to go and inspect, liaising with the EU, America and say, ‘right, we are going to inspect your country because your meat is coming from here and we want to see that you are up to these standards as well’ and they should be able to do that as well.” (Aberdeen WS2)*

*“Because there is this whole issue being raised of imported meat, which we obviously feel should be controlled in the same way as our own production.” (Croydon WS2)*

It was also not surprising given the concerns people had expressed in relation to trust, that participants wanted the system of controls and the policing of these to be transparent in order to foster public confidence. For example, some participants wanted

the public to be able to access the database in order to see for themselves that things were working as they should:

*“Which means at any given time whether you’re a government body or regulatory body, anybody can go in and have a look at the conditions, have a look at the way farmers are running their business.” (Belfast WS2)*

Although not a method of control in itself, there was a call for more research to be carried out into the area both to improve the efficacy of the cloning process and to confirm that food derived from such animals and their offspring is safe. In particular, participants wanted to see food safety trials being conducted along the lines of clinical drug trials. If the public are to trust the findings of such work it needs to be perceived as independent, the source of funding of the research should be made public and the findings should be published in peer reviewed journals:

*“Because as far as we can see we’re actually on the back of everybody else’s research. No independent research has actually been done here.” (Croydon WS2)*

### 8.3 Consumer Choice

There was also universal agreement that all food derived from clones and their offspring should be labelled to enable consumers to make an informed choice. This was not just driven by concerns relating to food safety but to the broader set of concerns that participants had expressed and, for this reason, even if such food was safe to eat, consumers should be given the choice whether or not to buy and/or consume such food.

Labelling should:

- apply to all types of food (e.g. processed as well as meat cuts) and all types of food outlets (e.g. restaurants as well as supermarkets):

*“So we’re talking about processed food as well as meat in the supermarket or butchers, and also including as we’ve said, restaurants and other places that serve prepared food.” (Croydon WS2)*

- be clear and accurate without overloading the consumer; suggestions were put forward including the use of colour coding, symbols (cf Red Tractor) or logos (e.g. FSA approved):

*“We also did think that if it’s FSA approved, there’d be a certain logo they could put onto the product.” (Aberystwyth WS2)*

- cover both clones and their offspring – possibly by indicating the generation of the animals involved:

*“Labels should be as specific as right down to even a great great great great grandparent of a certain animal being a clone. So you know if there’s any trace of it at all.” (Belfast WS2)*

Participants recognised that this could be problematic especially where an animal is several generations removed from a cloned ancestor:

*“They’d never be able to track where everything came from and label it.” (Croydon WS2)*

Despite some discussion of this issue, participants failed to come to any real resolution although there was a feeling it should at least apply to first and second generations as well as the clones themselves:

*“Also to put on there whether it was from cloned animals and if it was which generation, there should be a code for which generation it was...”*

***...Sorry can I pick up on that, how far would that go because obviously if it’s from a clone, an offspring of a clone, but how far down the chain...***

*...Exactly...*

*...It sounds sensible to me but I don’t know. I don’t really know anything, if they use a number 1, 2, 3, 4...*

*...I don’t know how you would.” (Aberystwyth WS2)*

In addition to a system of labelling, a number of participants, especially those opposed to the idea of consuming such food, wanted to see measures put in place to ensure alternatives are always available. This seemed to be based on the premise that cloning could become so successful and popular that the majority of animal livestock would be produced in this way at some point in the future. For example, the idea of grants was put forward to ensure farmers did not come under unnecessary pressure to switch to cloning.

Another suggestion was for the staged introduction of such foods in order to see how it works in practice and to allow consumers the chance to get used to the idea. Once

again, this seems to reflect an assumption that once animal cloning receives the go-ahead, it will open the flood gates to large volumes of such food coming on to the market:

*“So that there is still a fair percentage of meat being produced in a normal way that we do it at the moment.” (Croydon WS2)*

In addition to labelling, there was a call for public information and education. The public needs to know what cloning means in order to be able to exercise an informed choice:

*“I don’t know if that comes under the controls and policies, but people just don’t know about it and there’s no point in sticking it on the label if they don’t actually tell them what it means in the first place.” (Aberystwyth WS2)*

Suggestions as to the form this might take included:

- a media campaign (TV, radio, DM, leaflets, in-store etc)
- an unbiased presentation of the ‘pros and cons’
- signposting to further information for those interested in finding out more
- activities in school to educate the next generation of consumers (especially if food derived from clones and their offspring is to become widespread in the future)
- and, possibly, celebrity endorsement although this would depend on the choice of celebrity:

*“I think it would influence a hell of a lot of people myself...*

*...I mean if you got Delia Smith or somebody saying ‘well, this is great’, a lot of people are going to say well, ‘Delia Smith says’...*

*...’Delia says it’s alright’...*

*...I mean he [Jamie Oliver] is all for welfare but he’s very careful about Sainsbury’s because they are his employer.” (Aberystwyth WS2)*

#### 8.4 Role of the Food Standards Agency

Although participants had been given a fact sheet about the FSA and pointed in the direction of its website, it was clear that most were uncertain about its general role as

well as the specific part it might play in relation to cloning and food derived from clones and their offspring. Nevertheless, there was an expectation that it might:

- act as the licensing authority and develop the standards and guidelines
- police the inspections and audits and revoke licences where necessary
- provide information to, and educate, the public.

Whatever its role, it was seen as vital that it is independent from all the players (including Government) and trustworthy:

*“There has to be a two-way street between both the Agency and the customer.” (Belfast WS2)*

*“The FSA should be more empowered, it should become an independent thing. The Government should give them the power and say ‘right, you know we are not going to influence you in any way. You make the calls, you make the choices.’” (Aberdeen WS2)*

*“And the key thing was because some of us were particularly worried, we have some sort of concerns about cloning, it was important that the Food Standards Agency was an independent body that we could trust. The Food Standards Agency as being independent from commercial organisations.” (Aberystwyth WS2)*

Some participants felt there should either be a new body or the FSA should work in partnership with others. For example, some suggested having a food ombudsman or a new regulatory body that only deals with animal cloning and the implications of cloning for food. Their reasons for suggesting this were to guarantee that the body in control had the relevant expertise as well as a single minded focus:

*“It would be specifically just to deal with licensing the farms that are cloning. It would also be doing background checks for each, like for six months or whatever it is they normally do. Also, making sure that the farms are keeping up to certain standards, otherwise again, they would be knocked off the register. Also, they’d be doing the health tests along with the FSA just so that we can actually get informed as well.” (Aberdeen WS2)*

Others felt the FSA should work with a range of specialist interest groups, including consumer groups, animal welfare experts, human health experts and so on. This was again in order to ensure all interests were represented and that a full range of skills and expertise was brought to bear on the issues:

*“These controlling bodies should be more than one body. For instance, the FSA, people from animal welfare, people from human welfare, should side this. There will be a set of regulations created by these people. This will be on things such as making sure that the animals are treated properly, all the risks to humans have been ruled out as much as possible and so on and so forth.” (Aberdeen WS2)*

A third school of thought was that the FSA should have total control not just on the food production but also on the animal cloning side. This was in contrast to having several government bodies involved which could result in things slipping between the lines of control:

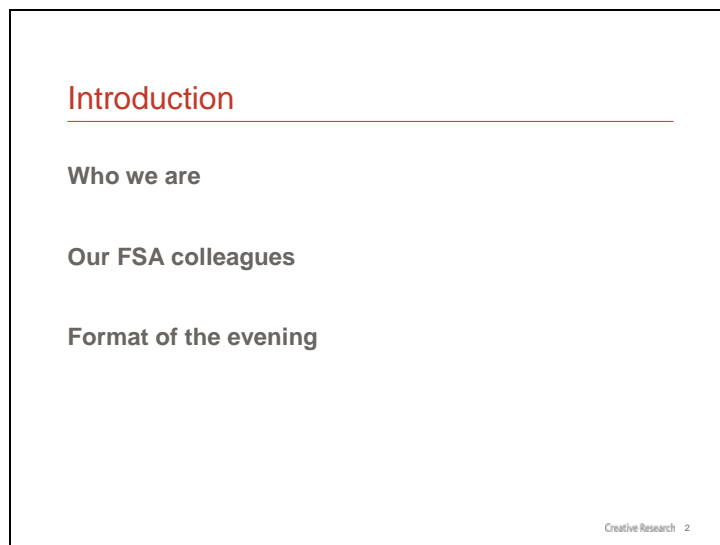
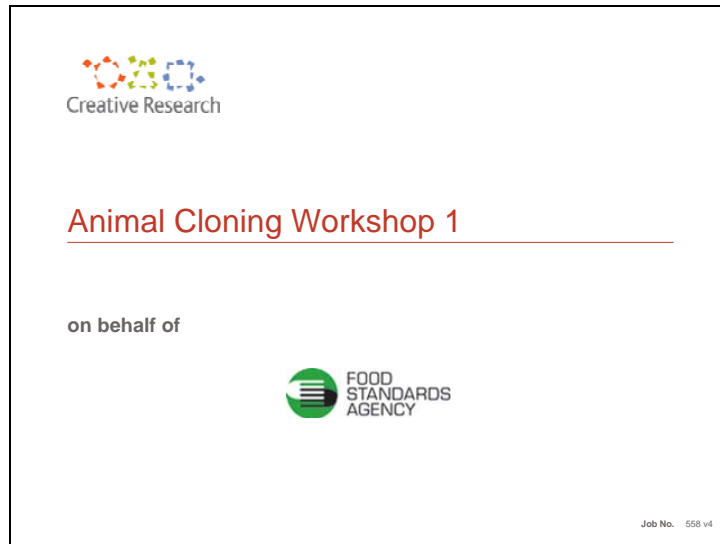
*“Mainly because there are so many segments of this process all the way down the line. If one agency has got control, they are going to know what’s going on from the start, right the way through to the finish. If anything does go wrong or you need to talk to anybody about packaging, labelling, how long can you keep it before, you can phone one agency. At the moment if you get dirty packaging, where do you go to - the council, the firm itself, do you know what I mean? I would like to see the FSA taking total control.” (Aberystwyth WS2)*

# 9 Appendices

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## 9.1 Stimulus Material

### 9.1.1 Workshop 1





## Breakout Session 1

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Creative Research 3



## Plenary Session 1

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Creative Research 4

## Breeding methods used by livestock farmers

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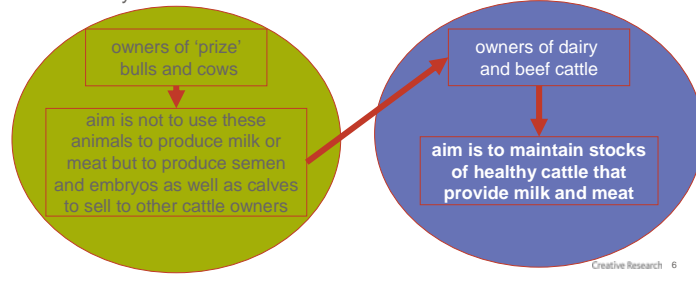
- Man has been farming livestock for several thousand years
- Animals that are found on farms today bear little resemblance to their original wild ancestors
- This is because farmers have used **selective breeding**
  - they use their healthiest and most productive animals to produce the next generations
  - each generation is more likely to show a combination of desired traits, such as better quality meat or higher milk production
  - in breeder's best interest to aim for fit, healthy animals = higher yields & lower costs
- Animals that are used extensively in breeding programmes – such as prize bulls, ewes and pigs – are extremely valuable since their offspring are expected to perform better than the average

Creative Research 5



## Assisted Reproductive Technologies

- Farmers use a number of different methods to improve the efficiency of their breeding programmes
- Many of these technologies are expensive and are mainly used by the owners of 'prize' bulls and cows who can sell the semen and embryos as well as calves to other farmers



## Assisted Reproductive Technologies

- The techniques include:
  - artificial insemination
  - oestrous synchronisation
  - embryo transfer
  - in vitro fertilisation
  - sexed semen
- In the following examples, we have focused on cattle however the techniques are used with lots of different animals, including sheep and pigs.

## Assisted Reproductive Technologies

### Artificial Insemination

- Used by breeders for hundreds of years although has come into widespread use only in the last 50 years
- Involves the collection of semen from bulls which can then be used to artificially inseminate cows (also used with other livestock)
- It is possible to freeze the semen, store it for longer and make it more widely available

### Oestrus Synchronisation

- Involves giving hormone implants and injections to ensure a group of cows are ready for breeding at the same time
- In one sense, it is a bit like a contraceptive pill in reverse
- Often used in conjunction with AI

## Assisted Reproductive Technologies

### **Embryo Transfer**

- Just as AI is used to produce lots of calves from a single, prize bull, embryo transfer is used to produce more offspring from a prize cow
  - the prize cow is stimulated with a hormone to produce a number of eggs at once
  - she is mated (either naturally or by AI) and many of the eggs are fertilised and start to develop
  - the embryos are flushed out surgically and implanted into the uterus of surrogate mothers where they are brought to term
- The embryos can be frozen so they can be stored for longer and made more widely available

Creative Research 9

## Assisted Reproductive Technologies

### **In Vitro Fertilisation**

- This is a similar process to embryo transfer except the unfertilised eggs of the elite cow are fertilised in an incubator before being transferred to surrogate mothers
- This is the same process used in humans, producing so called “test tube babies”

### **Sexed Semen**

- The purpose of this is to produce a higher proportion of a preferred sex of calves. For example in a dairy herd it would be preferable to have a higher proportion of female calves

Creative Research 10

## Assisted Reproductive Technologies

**Any Questions?**

Creative Research 11

## Animal Cloning

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Creative Research 12

## Animal Cloning

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### What is Cloning?

- **Cloning** is the creation of an organism (the clone) that is an **exact genetic copy** of another organism (the donor)
- **Clones occur in nature** – even in humans
- **Cloning is widely used in horticulture** – you have probably created clones in your back garden
- **Although a clone is an exact genetic copy it will not necessarily look or behave exactly like the donor organism**
- **Scientists have developed a number of different ways of creating clones**
- **Cloning can also be used by livestock breeders as another form of selective breeding**
  - and it is this use of cloning we are here to discuss and debate

Creative Research 13

## Animal Cloning

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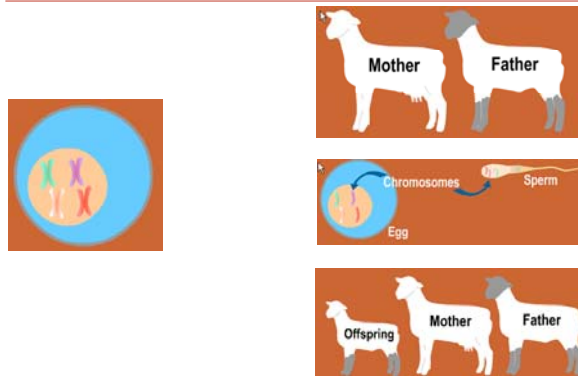
### How is it done?

- Scientists have developed 3 different methods of cloning
- Details of all 3 methods are contained in your information packs
- The method we would like you to focus on is called **reproductive cloning**
  - it is the method that was used to create Dolly the sheep
  - this is the method that is likely to become more widely used by livestock breeders
  - it is the method of animal cloning that is the focus of our discussions



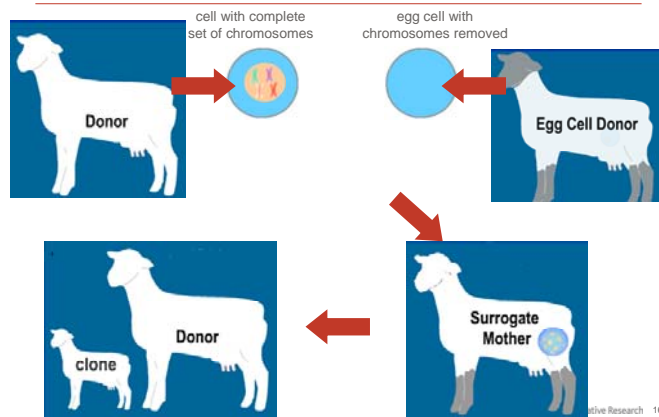
Creative Research 14

## Normal Fertilisation



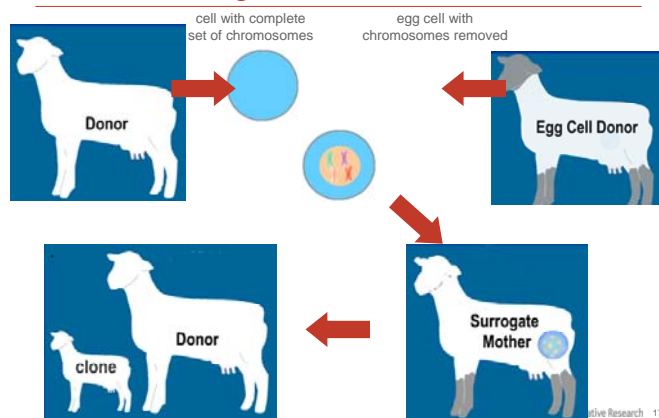
Creative Research 15

## Animal Cloning



Creative Research 16

## Animal Cloning



Creative Research 17

## Animal Cloning

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**Any Questions?**

Creative Research 17

## Breakout Session 2

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Creative Research 18

## Plenary Session 2

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Creative Research 19

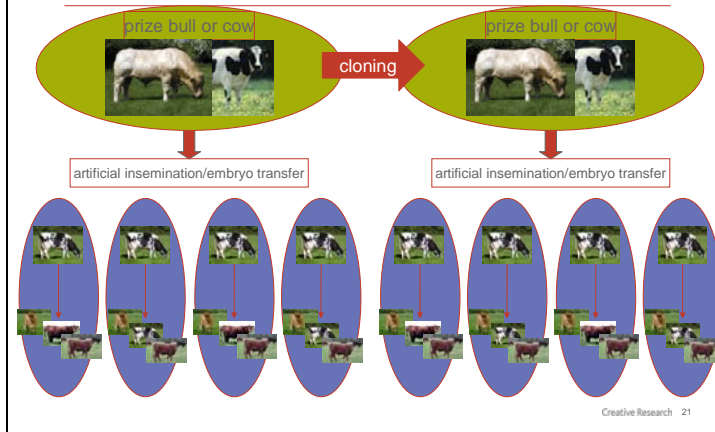
## Cloning Farm Animals

### How might animal cloning be used by livestock breeders?

- The technology is expensive so cloning will probably only be used by the owners of 'prize' animals e.g. ones that produce the most milk or the best meat, are the fittest and healthiest, etc.

Creative Research 20

## Cloning Farm Animals



Creative Research 21

## Cloning Farm Animals

### Implications for food

- Cloned animals would be used for breeding rather than for producing food (meat, milk, etc) although when a cloned animal dies it might end up in the food chain
- The offspring of cloned animals would be used to provide food so meat and milk from these animals could end up in the food chain

### Where is this happening?

- Reproductive cloning is currently being developed as a technique in the USA, Japan and New Zealand, amongst others
- The US has a voluntary ban on cloned animals entering the food chain...  
...but it is expected that this will be lifted in the next few months
- To date, only 1 known example in the UK of a cow that is the daughter of a cloned animal... but this might change in the future

Creative Research 22

## Cloning Farm Animals

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# Any Questions?

Creative Research 23

## What Happens Next?

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### Tonight

- Complete another short questionnaire
- Pick up an information pack to take home

### Between Now and the 2<sup>nd</sup> session

- Read the information sheets
- Carry out your own research
- Discuss it with family and friends
- Complete a short questionnaire
- Think about the list of questions contained in the pack

### Next Session

- Come along ready to discuss these questions

Creative Research 24

## 9.1.2 Workshop 2



## Animal Cloning Workshop 2

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on behalf of



Job No. 558 v2

## Introductions

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**Share with the rest of the group one thing you have read or discovered since last week that has influenced your views**

Creative Research 2

## Food from Cloned Animals

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**Would you...?**

- buy and eat food derived from cloned animals?
- buy and eat food derived from the offspring of cloned animals?
- definitely not buy or eat such food
- or are you unsure what you would do

Creative Research 3

## Breakout Session 1

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Creative Research 4





## Plenary Session 1

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### Report Back



Creative Research 5

## Food from Cloned Animals

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It is widely expected that the US Food and Drug Administration will shortly endorse the safety of food from cloned animals and US breeders will lift their voluntary ban on cloned animals and their offspring entering the food chain

In time, the UK and other European countries will come under increasing pressure to do the same

### Imagine the following scenario

The group of independent experts, set up by the EU Food Safety Authority to examine the safety of such food, comes to the conclusion that food derived from cloned animals and their offspring is safe to eat

Following this, farmers in Europe, including the UK, start using cloning and, as a result, clones and their offspring begin to enter the food chain

Creative Research 6

## Food from Cloned Animals

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### If food derived from clones and their offspring were to be allowed to go on sale, how should this be done

- Should there be special regulations and controls?
- If regulation and control is needed, what form should this take?
- What could be done to enable consumers to make an informed choice?

### Food Standards Agency

- FSA is an independent Government department set up to protect the public's health and represent consumer interests in relation to food
- What role, if any, should they have in this?

Creative Research 7

Food from Cloned Animals

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**Any Questions?**

Creative Research 8

Breakout Session 2

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Creative Research 9

Plenary Session 2

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Report Back

Creative Research 10

## Food from Cloned Animals

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**If the necessary controls and regulations were in place, would you...?**

- buy and eat food derived from cloned animals?
- buy and eat food derived from the offspring of cloned animals?
- definitely not buy or eat such food
- or are you unsure what you would do

Creative Research 11

## A Final Task Before You Go

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- Complete one last questionnaire

**Thanks & Good Night!**

Creative Research 12

## 9.2 Self-Completion Questionnaires

At Start of 1<sup>st</sup> Workshop

Name \_\_\_\_\_

### Animal Cloning

**Q1 How much do you know about Animal Cloning?** Please give a score between 0 and 10 where 0 means you know nothing at all about it and 10 means you know a great deal about it.

Score

**Q2 How worried are you that animals can be cloned?** Please give a score between 0 and 10 where 0 means you are not at all worried and 10 means you are extremely worried.

Score

**Q3 Please briefly explain your answer to Q2**

## Animal Cloning

**Q1 How much do you know about Animal Cloning?** Please give a score between 0 and 10 where 0 means you know nothing at all about it and 10 means you know a great deal about it.

Score

**Q2 How worried are you that animals can be cloned?** Please give a score between 0 and 10 where 0 means you are not at all worried and 10 means you are extremely worried.

Score

**Q3 If your score at Q2 has changed since the start of the evening, please indicate what has led you to change your view – for example, have you heard something that has changed how you feel.**

**Q4 If a food product that you normally buy and eat (e.g. meat, milk or other dairy products) appeared in the shops and you found out that it was derived from the offspring of cloned animals, which ONE of the following comes closest to describing what you would do? Please tick the statement that best applies to you.**

Buy and eat the product as normal

Buy and eat it but plan to find out more about it

Only consider buying and eating it after I have found out more about it

Never buy or eat it again

Don't know what I would do

Something else


**Q5 Briefly explain your answer to Q4**

## Animal Cloning

**Q1 How much do you know about Animal Cloning?** Please give a score between 0 and 10 where 0 means you know nothing at all about it and 10 means you know a great deal about it.

Score

**Q2 How worried are you that animals can be cloned?** Please give a score between 0 and 10 where 0 means you are not at all worried and 10 means you are extremely worried.

Score

**Q3 If your score at Q2 has changed since the first session, please indicate what has led you to change your view – for example, have you discovered something that has changed how you feel.**

**Q4 If a food product that you normally buy and eat (e.g. meat, milk or other dairy products) appeared in the shops and you found out that it was derived from the offspring of cloned animals, which ONE of the following comes closest to describing what you would do?** Please tick the statement that best applies to you.

Buy and eat the product as normal

Buy and eat it but plan to find out more about it

Only consider buying and eating it after I have found out more about it

Never buy or eat it again

Don't know what I would do

Something else


**Q5 If the statement you have selected at Q4 has changed since the first session, please indicate what has led you to change your view – for example, have you discovered something that has changed how you feel.**

## Animal Cloning

**Q1 How much do you know about Animal Cloning?** Please give a score between 0 and 10 where 0 means you know nothing at all about it and 10 means you know a great deal about it.

Score

**Q2 How worried are you that animals can be cloned?** Please give a score between 0 and 10 where 0 means you are not at all worried and 10 means you are extremely worried.

Score

**Q3 If your score at Q2 has changed since the start of the evening, please indicate what has led you to change your view – for example, have you heard something that has changed how you feel.**

**Q4 If a food product that you normally buy and eat (e.g. meat, milk or other dairy products) appeared in the shops and you found out that it was derived from the offspring of cloned animals, AND THE NECESSARY CONTROLS AND REGULATIONS WERE IN PLACE, which ONE of the following comes closest to describing what you would do?**

Please tick the statement that best applies to you.

Buy and eat the product as normal

Buy and eat it but plan to find out more about it

Only consider buying and eating it after I have found out more about it

Never buy or eat it again

Don't know what I would do

Something else (briefly describe below)


**Q5 Please write in one key fact or argument that has had the most impact on your opinion over the course of the last couple of weeks.**

## 9.3 Discussion Guides

### 9.3.1 Workshop 1

At the start of the workshop as participants arrive they will be given a short self-completion questionnaire to fill out while waiting for everyone to arrive.

<b>Introduction (10 minutes)<sup>13</sup></b>
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- Moderators introduce themselves and any colleagues from FSA, COI etc
- Moderator explains that the FSA have asked us to carry out a consultation among the public to establish how people feel about a new technology that could have implications for food we buy and eat – they are here tonight as representatives of the wider British public and what they have to say will help the FSA decide how to respond to this new technology
- Usual reassurances provided about confidentiality together with ground rules e.g. everyone to make a contribution, by all means disagree with each other but respect differences in opinion etc
- Format of evening outlined:
  - mix of individual activities, small group work and everyone together
  - presentations of information as we go with discussions around what you hear and find out
  - opportunity to ask questions of representatives from FSA
  - some things to do at home after the session
  - a follow up session in a week's time

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<sup>13</sup> Timings are intended to give an indication of how long we might spend on each activity.



## Breakout Session 1 (40 minutes)

Participants divided into 2 groups – men and women.

### Introductions

- Participants asked to find out 3 things about person sitting next to them and then to introduce him/her to rest of group
  - first name
  - family circumstances (married/single, whether have any children)
  - what they do for a living

### Animal Cloning

- Moderator displays board with Animal Cloning on it; participants told to think about whatever comes to mind when they see/hear this term - given post-it notes and asked to write down any associations and stick these on the board; participants encouraged to write just one thing on each note (they can use as many notes as they like)
- Moderator briefly touches on the extent to which participants are familiar with the topic; if they don't know very much, where do their concerns come from?
- Discussion around this – moderator explores the range of issues raised, where these come from etc, looking for both common themes and one off comments

The aim here is to get 'on the table' as many different associations and issues as possible and get some sense on where people are coming from. We will not spend too long going into these in any great depth.

### Livestock Breeding Methods

- Moderator tells participants to 'car park' the animal cloning issue – we'll come back to that in a while
- Moderator explains we are now going to think about how farmers go about breeding their livestock. Moderator explains we are focusing on farmers who raise animals – cattle, pigs, sheep, poultry, goats etc – and not those who grow cereal and vegetables.
- **Imagination Exercise:** participants invited to close their eyes and imagine in their mind's eye a typical British livestock farm
  - as they're imagining this, they're encouraged to describe what they are 'seeing' (what types of animals are on the farm, how many animals there are, how they're looked after etc)
  - participants are then encouraged to think about how a typical British farmer goes about breeding his livestock – this is likely to be greeted with some slight embarrassment/ribald comments but we want to find out first of all what comes to mind without too much prompting
  - moderator then starts to direct the discussion as required: for example, do participants imagine that the farmer 'lets nature take its course – e.g. by putting the bull or ram in the field with some cows or ewes and leaving them to it'? If not, what might happen?
  - imagine a small, family run farm and a large industrial farm – would they both use the same breeding methods or might they be different? If so, in what way?
  - how might an organic farm be different, if at all?
  - if one or two participants are more knowledgeable than the rest, the moderator will ask them to hold back and explore the views of the rest of the group before inviting the more knowledgeable participants to have their say

The aim here is to explore people's views and knowledge in this area. Again, we will not spend too long going into these in any great depth.

### **Plenary Session 1: Breeding Methods (20-30 minutes)**

- Presentation of 'Breeding Methods Used by Livestock Farmers'
- Participants given a copy of the relevant slides so they can make any notes as we go along or write down questions etc
- Q&A session: participants encouraged to raise any questions or issues they have about the presentation
- Moderator will lead a short discussion around reactions to the information (depending on what comes out from the Q&A)
  - to what extent were participants surprised by what they heard? How much of this did they already know about? How does it differ from what they imagined?
  - how do they feel about what they've heard? Why is this?

### **Plenary Session 1: Animal Cloning (20-30 minutes)**

- Presentation of 'Animal Cloning'
- Participants given a copy of the relevant slides so they can make any notes as we go along or write down questions etc
- Q&A session: participants encouraged to raise any questions or issues they have about the presentation (NB need to avoid getting into too much of a debate at this point as this follows in the breakout session that follows but try to focus on providing clarification etc)

HALF WAY POINT ABOUT HERE

### **Breakout Session 2 (30-40 minutes)**

- Moderator leads a discussion around animal cloning
  - reactions to the idea – pros and cons
  - how much, if any of this, did they know about before tonight?
  - issues arising; concerns, questions
  - are they more concerned about animal cloning than they are about other methods of selective breeding we looked at earlier? If so, why is this?
- Once most of the issues have been covered, moderator sets the group a task:
  - they must identify a list of key questions they would like to have answered and any concerns about animal cloning they would like to have addressed
  - they will then be asked to present their questions and concerns back to the other group
  - moderator tells them they must appoint one or two of their group as scribes – their role is to write down on flip charts the group's questions and concerns
  - they must also appoint one or two to be presenters – their role is to present the group's views to the other group
- Moderator will tell them how long they have to complete the task (we will aim for about 20 minutes but this will depend on how we are doing for time)
- Moderator then takes a back seat, leaving the group to carry out their task but keeping an eye on things to make sure the group know what they should be doing and making sure they keep to the timings

### **Plenary Session 2: Report Back (20 minutes)**

- Each group is given about 10 minutes to report back their questions and concerns briefly explaining why they have posed these

### **Plenary Session 2: Cloning Farm Animals (20-30 minutes)**

- Presentation of 'Cloning Farm Animals'
- Participants given a copy of the relevant slides so they can make any notes as we go along or write down questions etc
- Q&A session: participants encouraged to raise any questions or issues they have about the presentation
- If time permits, moderator will follow up with a discussion
  - participants' views on what they have heard? How much of it was new information?
  - do they feel cloning of farm animals is desirable/undesirable? Why is this?
  - what is their reaction to:
    - cloned animals ending up in the food chain?
    - the offspring of cloned animals ending up in the food chain?

### **Plenary Session 2: What Happens Next (10 minutes)**

- Moderator explains what we would like participants to do next
- Self completion questionnaires completed
- Information packs handed out

Participants depart

### 9.3.2 Workshop 2

Participants complete the self-completion questionnaire while waiting for everyone to arrive.

<b>Introduction (15-20 minutes)</b>
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- Moderators greet everyone and briefly outline the format of this session
  - mix of small group work and everyone together
  - some information but the emphasis tonight is more on participants working together to share their views and, where appropriate, trying to persuade everyone else to share their views
- Each participant is invited to describe one thing they have read or found out since the last session that has influenced their thinking on the topic
- Participants arrange themselves into 3 groups:
  - those who would be prepared to buy and eat food derived from cloned animals and their offspring
  - those who definitely would not be prepared to do so
  - and those who are undecided either way

At this point we will need to be flexible depending on how people divide up. Our aim is to have 3 sub-groups each with a different starting point. However, we will need to be flexible - for example, if the majority of participants would definitely not buy or eat such food, we may divide them up into two sub-groups. Similarly, if we get some people who are prepared to eat food derived from the offspring of cloned animals but not clones themselves, we might treat them as a separate group.

(Moderators to make a note of who is in each group)

### Breakout Session 1 (30-45 minutes)

- Each group is set a task. They need to discuss why they feel as they do about the issue and prepare an argument to present back to the other groups to try and persuade them to join their group:
  - those who are prepared to buy and eat such food should focus on the reasons why they are willing to do this; they should also try to think what the other groups will say and come up with counter arguments
  - those who are not willing to eat such food do the same in reverse
  - those who are undecided should focus on both the pros and cons and why they are undecided – what sorts of arguments or information would make them more or less likely to buy and eat such food
- Each group is given a set time to complete their task at the end of which they must have prepared their case and be ready to present it
- Each group will be told to appoint one or more scribes (whose task is to capture the arguments and write it up as a set of bullet points) and one or more presenters who will deliver their argument to the other groups
- Participants are told they can ask the FSA experts any questions at any point to help them prepare their case
- These activities are not moderated; the moderators will stay in the background but will be on hand to ensure everyone knows what they are doing, to provide any guidance that may be needed and to keep the group on task and on time

NB Moderator to note whether concerns relating to animal welfare, ethics etc get aired by each group and if not should seed these into the discussion. If the group is not concerned about these issues, moderator will suggest they should be ready to counter any arguments that the other groups might put forward relating to these types of concern

### Plenary Session 1 (30-45 minutes)

- Each group presents its case back to the others; at the end of each presentation, the other groups are encouraged to respond, to ask questions, point out any flaws in the argument and generally to debate the points being raised
- At the end of the presentations, participants are invited to move between groups if they feel the arguments they have heard have convinced them. Those who move are invited to explain what, in particular, has persuaded them

#### **(NB moderators to keep note of who moves where)**

- Once all the groups have made their presentations, moderator introduces the imaginary scenario and the associated questions. Participants are given the opportunity to ask any questions before returning to their breakout groups
- Moderator will remind participants at this point that one of the aims of the research is to help the FSA influence the EU. If it is decided that food derived from cloned animals is safe to eat, the EU will need to decide what conditions, if any, livestock breeders and

food producers would need to meet. The participants' response to the current task will be very helpful in shaping the FSA's input to discussions with our European partners.

### Breakout Session 2 (30-45 minutes)

- The group divides up as before based on their views on buying and eating food derived from cloned animals (if anyone has changed their mind, they will go with their new group). Each breakout group will be given the list of issues to think about on an A3 sheet to encourage them all to focus on the issues.
- This session follows the same pattern as before except now the group's task is to consider the questions posed about regulation and control and the role of the FSA. They need to decide what their view is and then prepare a set of arguments to take back to the others
- Participants are told they can ask the FSA experts any questions at any point to help them prepare their case

Moderators will monitor the progress of each breakout group and will be proactive in encouraging them to engage with the task. This could include, as appropriate:

- encouraging them to turn negatives into positives; for example, if they are really opposed to buying such foods, what can be done to allow them to exercise their choice
- encouraging them to think about circumstances when they might be prepared to buy/eat such food; e.g.
  - if the USA allows such food to go on sale without any requirements for it to be labelled would they visit the US? Would they eat meat and dairy products while they were there?
  - what if someone like Jamie Oliver was to endorse meat and dairy products derived from cloned animals?
- ensuring that they consider the questions in sufficient detail, for example
  - if labelling is considered important which products should be labelled and what information should be included?
  - if controls and regulations are needed, what are these designed to do/achieve? Are they practical/achievable? How would they be monitored?

### Plenary Session 2 (30-45 minutes)

- Each group presents its case back to the others; at the end of each presentation, the other groups are encouraged to respond, to ask questions, point out any flaws in the argument and generally to debate the points being raised
- At the end of the presentations, participants are asked **if the necessary controls and regulations were in place** would they be willing to buy and eat food derived from cloned animals and their offspring
- Moderator would check at this point how participants would feel if clones themselves were not allowed to enter the food chain but the offspring of clones were allowed to enter? Does this make any difference to how they feel and what they might do?

- **IF TIME PERMITS:** we would invite each participant to suggest one key fact or argument that has had most impact on their opinion over the course of the evening – something that has either confirmed their view or has caused them to reconsider their opinion
- Final copy of the self-completion questionnaire distributed

Thanks and Good Byes.

## 9.4 Recruitment Questionnaire and Guidelines

Hello, I'm .....from Creative Research, an independent market research company. I wonder if you would be interested in taking part in some research we are conducting on behalf of the Food Standards Agency (FSA). It is to do with a new technology related to the production of food which has the potential to affect all of us. The FSA are keen to find out how the public feels about this new technology. It involves taking part in **two discussion sessions**, with other people like yourself to share views and ideas, and also doing some research on your own in between. Each discussion session would last up to 3 hours. In return for your time, I can offer you **£100** as a contribution towards your expenses; we would give you £35 at the first session and £65 at the second.

### KEY DEMOGRAPHICS

#### D1 SOCIAL GRADE OCCUPATION OF HEAD OF HOUSEHOLD:

#### ASK THE FOLLOWING FIVE QUESTIONS TO CLARIFY HEAD OF HOUSEHOLD INFORMATION:

IF RETIRED, ASK FOR PREVIOUS OCCUPATION, IF PRIVATE PENSION RECEIVED

IF LOCAL AUTHORITY OR CIVIL SERVICE OR ARMED FORCES, ASK GRADE/RANK

IF SELF-EMPLOYED OR MANAGERIAL, ASK FOR NO. OF EMPLOYEES RESPONSIBLE FOR

ASK FOR DETAILS OF TRAINING/QUALIFICATIONS

INDUSTRY (WRITE IN)

#### NOW CODE SOCIAL CLASS

ABC1	1	<b>RECRUIT TO QUOTA</b>
C2DE	2	

<b>D2 Gender</b>			<b>D4 Group (please code below the relevant group)</b>		
Male	1	<b>RECRUIT TO QUOTA</b>	Workshop 1: London	1	
Female	2		Workshop 2: Wales	2	
			Workshop 3: Scotland	3	
<b>D3 Age: write in &amp; code below</b>			Workshop 3: Northern Ireland	4	
Under 25	1	<b>CLOSE</b>	<b>D5 Vegetarian (code at Q1a and here)</b>		
25-35	2	<b>RECRUIT TO QUOTAS</b>	Yes	1	<b>RECRUIT TO QUOTA</b>
36-45	3		No	2	
46-60	4		<b>D6 Type of shopper-consumer (code at Q1b &amp; Q1c and here)</b>		
61-70	5		'Mainstream'	1	<b>RECRUIT TO QUOTA</b>
Over 70	6	<b>CLOSE</b>	Only/ mainly organic or 'freedom'	2	
<b>D7 Lifestages (Code at Q4 and here)</b>			Older Families	3	<b>RECRUIT TO QUOTA</b>
Pre-family	1	<b>RECRUIT TO QUOTA</b>	Post Nester	4	
Younger Families	2		Retired	5	



**SCREENING**

<b>S1. SHOW CARD A</b> Can I just check, do you or any of your immediate family work in any of the following professions or occupations?					
Market Research or Marketing	1	<b>CLOSE</b>	Biotechnology	5	<b>CLOSE</b>
Public Relations or Journalism	2		Animal Welfare	6	
Advertising	3		Farming*	7	
Central Government	4		Food production / food manufacturing	8	
			None of these	9	<b>CONTINUE</b>
<b>S2a.</b> Have you <u>ever</u> attended a <b>GROUP DISCUSSION</b> or <b>IN-DEPTH INTERVIEW</b> before?			<b>S2b.</b> What was the subject under discussion?		
No	1	<b>GO TO Q1</b>	<b>IF PREVIOUS SUBJECT RELATED TO THIS TOPIC, THANK &amp; CLOSE. OTHERWISE ASK QS2c</b>		
Yes	2	<b>GO TO S2b</b>			
<b>S2c.</b> How long ago was that?			<b>S2d</b> How many group discussions, research workshops and/or depth interviews have you attended in the last 3 years?		
Less than 6 months	1	<b>THANK &amp; CLOSE</b>	1-4	1	<b>GO TO Q1</b>
More than 6 months ago	2	<b>GO TO S2d</b>	5 or more	2	<b>THANK &amp; CLOSE</b>

**\* Agricultural workers can be recruited but farm owners/ managers of farms must not be recruited**

<b>INTERVIEWER DECLARATION</b>	
I DECLARE THAT THIS IS A TRUE RECORD OF A FACE TO FACE INTERVIEW WITH THE NAMED RESPONDENT WHICH WAS CONDUCTED IN ACCORDANCE WITH THE INSTRUCTIONS AND THE CODE OF CONDUCT.	
SIGNATURE: _____	
PRINT NAME: _____	DATE: _____

**Q1: Consumption**

**Q1a. ASK ALL AND SHOW CARD B** Which of the following best describes you?

I eat meat and/or meat products, at least some of the time	1	<b>Recruit to quota</b>
I am a vegetarian	2	
I am a vegan	3	<b>CLOSE</b>

**Q1b. ASK ALL AND SHOW CARD C** Which of the following statements best describes how often, if at all, you buy organic food products?

I never buy organic food products	1	<b>Recruit to quota</b>
I occasionally buy organic food products	2	
I tend to buy a mix of organic food products, and those that are not organic	3	
I mainly buy organic food products and tend to only opt for products that are not organic when there isn't a choice	4	
I only ever buy organic food products	5	

**Q1c. ASK ALL AND SHOW CARD D** Which of the following statements best describes how often, if at all, you buy free range or 'freedom' food products?

**Note to recruiter:** If respondents do not know what freedom foods are, or how much they buy, they are still eligible - please code as 'don't know' and continue.

I rarely/ never buy freedom food products	1	<b>Recruit to quota</b>
I occasionally buy freedom food products	2	
Where possible, I always buy freedom food products	3	
Don't Know	4	

**Q2. Attitudes SHOW CARD E.** For each the following, please tell me if you have **campaigned or protested\***:

\*Note to recruiter: by 'campaigned or protested' we mean taken actions such as starting a petition, writing letters of protest, going on a march, etc.

For animal rights	1	<b>CLOSE</b>
Against 'animal testing' (such as for scientific research or consumer products)	2	<b>CLOSE</b>
Against 'intensive farming' (such as 'battery hens')	3	<b>CLOSE</b>
Against genetically modified food	4	<b>CLOSE</b>
None of these	5	<b>CONTINUE</b>

**Q3: INTEREST IN THE NEWS****SHOW CARD F** Which of the following statements best describes how interested you are in the news/ current affairs?

I am very interested and always keep an eye on what is going on	1	<b>SEE QUOTA CONTINUE</b>
I am fairly interested and try to keep informed of what is going on	2	
I am quite interested in some things in the news but don't always keep up to date with what is going on	3	
I am not at all interested and don't pay much attention to what is going on in the news	4	<b>CLOSE</b>

Q3b Which are your main sources of news and information about current affairs? (more than one may apply)

TV	1	<b>GO TO Q4</b>
Radio	2	
Newspapers	3	<b>GO TO Q3c</b>
Online newspapers	4	
Other Internet sources	5	<b>GO TO Q4</b>
Other/don't know	6	

ASK THOSE CODING 3 OR 4 AT Q3b:

Q3c. **SHOW CARD G** Please can you tell me which, if any, of the following daily newspapers you read either as a paper or online? (more than one may apply)

The Daily Express	1	<b>ENSURE MIX OF NEWSPAPERS READ ACROSS EACH WORKSHOP</b>
Daily Mail	2	
Daily Mirror	3	
Daily Record	4	
Daily Star	5	
The Sun	6	
Daily Telegraph	7	
Financial Times	8	
The Guardian	9	
The Independent	10	
The Times	11	
Local daily newspaper	12	
Other	13	

<b>Q4: Lifestage</b>						
Q4a. Please can you tell me if you have any children aged 16 or over living at home with you?						
		Yes	1	<b>GO TO Q4b</b>		
		No	2	<b>Pre-family, empty nester or retired - recruit to quota</b>		
Q4b. You say you have children. Please tell me the ages of your child(ren). Record for each.						
	Child 1	Child 2	Child 3	Child 4	Child 5	
10 or under						<b>Recruit to quota</b>
11-16						

Explain to respondent the nature of the research:

An initial workshop lasting up to three hours

An information pack to take home and read along with some other activities to carry out

A follow-up workshop one week later also lasting up to three hours.

Explain that they will receive a payment of £100 for taking part in two instalments - £35 at the first workshop and £65 at the second.

You should only recruit someone who agrees to attend both sessions and is prepared to spend a couple of hours in between doing some 'homework.'

#### **Give Respondent Show Card H**

The workshops you will take part in will be tape recorded and transcribed.

This card describes how the information you provide will be used and the steps that will be taken to protect your confidentiality.

Please sign below to indicate your agreement with this procedure.

Name: _____
Signature: _____
Date: _____

Occasionally, once a project is completed we may need to re-contact people who take part in a research study either to follow up something that has arisen or to invite them to participate in some research on a new topic.

Would you be willing for us to contact you in the future, should the need arise?

YES [  ] Record contact details below

NO [  ] Explain that you need to record the respondent's contact details so that they can be contacted in the event of a change of plans (e.g. the moderator is ill) and also for quality control procedures. Reassure respondents that this information will **only** be used for these purposes.

**RESPONDENT DETAILS**

REASSURE RESPONDENTS THAT NO PERSONAL DETAILS OR RESPONSES WILL BE PASSED ON TO ANYONE NOT DIRECTLY CONCERNED WITH THE RESEARCH.

NAME: \_\_\_\_\_

ADDRESS: \_\_\_\_\_ Postcode \_\_\_\_\_

PHONE NO: \_\_\_\_\_ NO PHONE ( ) REFUSED NO ( )

**SHOW CARD A**

**Market Research or Marketing**

**Public Relations**

**Journalism**

**Advertising**

**Central Government**

**Biotechnology**

**Animal welfare**

**Farming**

**Food Production / Food manufacturing**

**None of these**

**SHOW CARD B**

**I eat meat and/or meat products, at least some of the time**

**I am a vegetarian**

**I am a vegan**

**SHOW CARD C**

**I rarely/ never buy organic food products**

**I occasionally buy organic food products**

**I tend to buy a mix of organic food products and those that are not organic**

**I mainly buy organic food products and tend to buy food products that are not organic only when there isn't a choice**

**I only ever buy organic food products**

**SHOW CARD D**

**I rarely/ never buy freedom food products**

**I occasionally buy freedom food products**

**Where possible, I always buy freedom food products**

**Don't Know**

**SHOW CARD E**

**For Animal Rights**

**Against any forms of 'animal testing' (such as for scientific research or consumer products)**

**Against 'intensive farming' (such as battery hens)**

**Against genetically modified food**

**None of these**

**SHOW CARD F**

**I am very interested and always keep an eye on what is going on in the news**

**I am fairly interested and try to keep informed of what is going on in the news**

**I am quite interested in some things in the news but don't always keep up to date with what is going on**

**I am not at all interested and don't pay much attention to what is going on in the news**

**SHOW CARD G**

**The Daily Express**

**Daily Mail**

**Daily Mirror**

**Daily Record**

**The Daily Star**

**The Sun**

**Daily Telegraph**

**Financial Times**

**The Guardian**

**The Independent**

**The Times**

**Local daily newspaper**

**Other**

## SHOW CARD H

**The Data Protection Act requires that we collect and use the information you provide to us in a manner that respects and protects your confidentiality.**

**Your personal details (name, address, phone number) will not be disclosed to anyone else without your permission other than Creative Research, the company carrying out the research.**

In most cases the audio recording will be heard and the transcription read **only by the transcriber and researchers from the research company.**

The transcript will only be read, and the recording listened to for research purposes and only to pursue the aims of the study. Excerpts from the transcripts or recording may be used to illustrate the research findings. This will always be done in a way to protect your identity (e.g. comments will not be attributed).

The recordings will not be used for non-research purposes, such as promotion or direct sales activities.

The recording may be listened to, and the transcription read, by people from the client organisation working on this project. In these circumstances, we will go through the recording first to delete any references to people's names or anything else that could identify them.

Anyone from the client organisation who reads the transcript or listens to the recording will sign an undertaking that they will respect the anonymity of those taking part. Thus, if anyone recognises you, (s)he will immediately stop reading or listening.

**Any other material or information** generated by you, such as ideas written down on paper, will be subject to the same strict controls.



## RECRUITER INSTRUCTIONS

This research is being conducted on behalf of the Food Standards Agency. It is to do with a new technology related to the production of food which has the potential to affect all of us. The Food Standards Agency is very keen to find out how the public feels about this new technology. We do not expect the general public to be knowledgeable about this subject at all - so please reassure them that they do not need to do any research before coming along (in fact, we'd rather they didn't).

### Methodology and Format

We wish to conduct four sets of 'reconvened workshops' across four locations shown in the table below. The format for each location will be;

- 18 participants will attend an initial 3 hour workshop session
- Following this, they will be given an information pack to take home and read, along with some other activities to carry out, in preparation for the reconvened workshop one week later
- The second 3 hour workshop will reconvene one week after the first

Workshop Number and Area	1 <sup>st</sup> Session	2 <sup>nd</sup> Session	Location Type
1. England - Croydon	29 <sup>th</sup> November 2007	6 <sup>th</sup> December 2007	Metropolitan
2. Wales – Aberystwyth	16 <sup>th</sup> Jan 2008	23 <sup>rd</sup> Jan 2008	Rural
4. Northern Ireland – outskirts of south Belfast	17 <sup>th</sup> Jan 2008	24 <sup>th</sup> Jan 2008	'Semi-rural'*
3. Scotland – Aberdeen	30 <sup>th</sup> Jan 2008	6 <sup>th</sup> Feb 2008	Urban

\* For the semi rural location please recruit some people living in the town and some living in the countryside.

### Exclusions

In addition to the usual exclusions, please do not include the following:

- those with more extreme views on animal welfare/ GM foods (i.e. those who code 1, 2, 3 or 4 @ Q2.)
- those involved in biotechnology, animal welfare, farming or meat production (i.e. those who code either 5, 6 or 7 @ S1)
- anyone working for a central government department (those who code 4 @ S1)
- anyone who follows a vegan diet (i.e. those who code 3 @ Q1a)
- those with no interest in current affairs (code 4 @ Q3a)

### Sample Specifications of Workshops

- Please aim for a spread of social grades in each workshop and record at D1.

- 8-9 participants to be ABC1
- 8-9 participants to be C2DE (but maximum 2 unemployed)
- maximum 2 students
- Each workshop should be split evenly between men and women (D2).
- All should be aged between 25 and 70 years old. In each workshop, mix of ages within this:
  - aim for half aged 25-45 years old (i.e. code 2 or 3 @ D3) - aim for a mix of ages within this.
  - and half aged 46-70 years old (i.e. code 4 or 5 @ D3) - aim for a mix of ages within this.
- Mix of lifestyles. In each workshop, aim for:
  - 3-4 'pre-families': those under 35 with no children (coding 2 @ 4a)
  - 3-4 of those with 'younger families': all children aged 10 or under (i.e. code 1 @ 4a, and with all children 10 or under at 4b)
  - 3-4 of those with 'older families': at least one child over 10 (code 1 @ 4a, and at least one child aged 11-16 at 4b – they may also have children aged 10 or under)
  - 3-4 'empty nesters': those 36 and over with no children living at home (code 2 @ 4a)
  - 3-4 retired (aged 60+)
- In each workshop, all except 2 should be meat eaters (i.e. code 1 @ Q1a). The 2 who do not eat meat should be vegetarians (i.e. code 2 @ Q1a).
- Please recruit mainly 'mainstream' shoppers/consumers. This should be those that do not mainly buy organic foods (i.e. code 1, 2, or 3 @ Q1b) and also do not mainly buy 'freedom food' products (i.e. those who code 1, 2 or 4 @ Q1c).
  - maximum of 2 per workshop who only or mainly buy organic products (i.e. code 4 or 5 @ Q1b) or mainly/ only buy 'freedom' products (i.e. code 3 @ Q1c)

Record people's main sources of daily news and information at Q3b (no quota). Then ask Q3c of those who read newspapers either in a paper form or online (codes 3 and 4 @ Q3b). Across the participants, we want to ensure a mix of newspaper readership (codes 1-12) i.e. they shouldn't all read the same couple of newspapers. It is also okay to include a few participants who do not read any daily newspaper or ones not listed (i.e. those coding 13 @ Q3c).

## 9.5 Fact Sheets

### 9.5.1 Fact Sheet 1: What is Cloning?

#### 1. What is Cloning?

**Cloning** is the creation of an organism (the clone) that is an **exact genetic copy** of another organism (the donor).

**Clones occur in nature** – many plants propagate in this way (for example, strawberries) and so do some animals (for example, amoeba – a microscopic single celled organism, and some insects, such as greenfly). It also even occurs sometimes in humans – identical twins can be thought of as clones as they share exactly the same genetic material.

**Although a clone is an exact genetic copy it will not necessarily look or behave exactly like the donor organism.** This is partly because of environmental differences which the donor and clone organisms may have experienced – for example, someone's weight and height will be influenced by their eating and exercise habits. It can also be due to differences in the way our genetic material is expressed. For example, the genes in each cell of our body can be 'turned on' or 'turned off' and the way we look or behave is influenced by which combinations of our genes are 'on' and 'off'. While a clone will have an exact copy of the donor's genes, the genes that are switched 'on' and 'off' may not be the same.

**Cloning is widely used in horticulture** – if you have ever grown a plant from a cutting or a graft you have produced a clone. Foods that we regularly consume, such as potatoes, bananas and grapes are derived from clones.

#### Different Methods of Cloning

In recent years, it has become possible to produce animal clones through scientific intervention. This has given rise to **three different types of cloning**

##### i. **Artificial Embryo Twinning** (also called embryo splitting)

This is a relatively low tech version of cloning. The technology mimics the natural process of creating identical twins. It involves taking an embryo at a very early stage of its development, manually separating the cells and allowing each cell to divide and develop on its own. The resulting embryos are then placed into surrogate mothers, where they are carried to term and delivered.

Whilst this process results in genetically identical twins, they will inherit a combination of maternal and paternal characteristics in the normal way.

##### ii. **Reproductive Cloning**

Reproductive cloning uses a process called **somatic cell nuclear transfer (SCNT)** to create animals that are genetically identical. This involves transferring the nucleus from a donor adult cell to an egg which has no nucleus. If the egg begins to divide normally it is transferred into the uterus of the surrogate mother where it is carried to term and

delivered. The resulting offspring will inherit all of its genetic material from a single, donor animal.

**This is the form of animal cloning that is likely to become more widely used in the future in the breeding of animal livestock. It is this method of cloning that is the focus of this particular project. For more details see Reproductive Cloning Using SCNT – A Closer Look below.**

### iii. Therapeutic cloning

This method of cloning also uses somatic cell nuclear transfer (SCNT); however the aim here is not to create adult animals but to use the embryos to extract embryonic stem cells (ESC). Once this has been done, the embryos are destroyed.

The ESCs are used for research. For example, the hope is that the ESCs could be used to develop new organs to be used for transplants. Another possibility is to help people with degenerative diseases (such as Alzheimer's) by replacing damaged cells with new, healthy ones.

**DNA Cloning (also known as recombinant DNA technology, molecular cloning or gene cloning)** is used by research scientists to produce copies ('clones') of small pieces of DNA or whole genes. This technology has a wide variety of applications in research including therapeutic research. This is not relevant in the context of animal cloning.

### Reproductive Cloning Using SCNT – A Closer Look

Somatic Cell Nuclear Transfer sounds a bit of a mouthful so let's begin by looking at what these terms mean.

**Somatic cell:** A somatic cell is any cell in the body other than the two types of reproductive cells, sperm and egg. These are also called germ cells. In mammals, every somatic cell has two complete sets of chromosomes, whereas the germ cells only have one complete set.

**Nuclear:** The nucleus is like the cell's brain. It's an enclosed compartment that contains all the information that cells need to form an organism. This information comes in the form of chromosomes; a chromosome contains a long chain of DNA. It's the differences in our DNA that make each of us unique.

**Transfer:** Moving an object from one place to another.

There are four key steps in the process.

Step 1: The first step is to isolate a **somatic cell** from an adult donor animal (this is the animal that is being cloned) together with the **unfertilised egg cell** from a second animal

Step 2: The **nucleus** is removed from the egg cell and destroyed. The **nucleus** from the somatic cell is transferred into the empty egg cell

Step 3: Under the right conditions, the egg cell, with its new nucleus, begins to behave just like an ordinary zygote (the named given to the cell that is produced when an egg and sperm fuse). It starts to divide and develops into an **embryo**

Step 4: The embryo is implanted into a surrogate mother and carried to term.

The natural fertilisation of an egg by a sperm and the SCNT cloning method both result in the same thing: a dividing ball of cells, called an embryo. So what exactly is the difference between these methods?

An embryo is composed of cells that contain two complete sets of chromosomes. The difference between fertilization and SCNT lies in where those two sets originated.

In fertilisation, the sperm and egg both contain one set of chromosomes. When the sperm and egg join, the resulting zygote ends up with two sets - one from the father (sperm) and one from the mother (egg). The resulting offspring will show some characteristics of each parent or, in some cases, may be unexpectedly different.

In SCNT, the egg cell's single set of chromosomes is removed. It is replaced by the nucleus from a somatic cell, which already contains two complete sets of chromosomes. Therefore, in the resulting embryo, both sets of chromosomes come from the somatic cell. The offspring is genetically identical to the donor and is expected to show similar characteristics.

## 9.5.2 Fact Sheet 2: Dolly – the first cloned sheep



### What's in a Name?

"Dolly is derived from a mammary gland cell and we couldn't think of a more impressive pair of glands than Dolly Parton's." (Dr Ian Wilmut who led the team of scientists that produced Dolly).

### 1. History of Dolly

Dolly was created at the Roslin Institute in Edinburgh using SCNT techniques (see fact sheet 1) and was born on 5<sup>th</sup> July 1996.

Although Dolly hit the headlines, she was not the first animal to be cloned. This accolade is thought to belong to a tadpole that was cloned in 1952. Previously, clones had been produced from embryo cells. The reason Dolly was so famous was because she was the first mammal to have been successfully cloned from an adult cell.

Producing Dolly was no easy task. It took 277 attempts which resulted in 29 embryos; these were implanted into 13 surrogate mothers but only one pregnancy went to full term.

Dolly was a normal sheep. She mated and produced normal offspring, and suffered from arthritis in a hind leg joint. Sheep can live to age 11 or 12 but on 14<sup>th</sup> February 2003, aged six and a half, Dolly was 'put to sleep' because she had contracted a virus that induces lung tumours.

This has led some people to speculate that cloned animals might be more susceptible to disease. It has also been suggested that Dolly aged more quickly because she was a clone of a 6-year old sheep. Extensive scientific tests carried out by scientists at the Roslin Institute failed to identify any abnormality with Dolly that would suggest premature aging. Any sheep that are raised indoors are prone to the lung disease that led to Dolly being 'put to sleep'. There is no evidence to support the idea that Dolly's early death was related to the fact she was a clone.

### 2. First of Many

Since 1996 scientists have also succeeded in cloning other animals from adult cells of donors. The list includes mice and rats, rabbits, horses and donkeys, pigs, goats, cattle, cats and dogs, gaur (an endangered species of Asian bison), deer and ferrets.

### 9.5.3 Fact Sheet 3: Current Breeding Techniques

#### **Selective Breeding**

Man has been farming livestock for several thousand years and the animals that are found on farms throughout the world bear little resemblance to their original wild ancestors. This is because farmers have used **selective breeding** by using their healthiest and most productive animals to produce the next generations. Farmers continue to control the way that their animals breed so that each generation is more likely to show a combination of desired traits, such as better quality meat, higher milk production, good fertility, low susceptibility to disease and general good health.

Animals that are used extensively in breeding programmes – such as prize bulls – are extremely valuable since their offspring are expected to perform better than the average.

#### **Assisted Reproductive Technologies**

Farmers are able to use a number of different methods to improve the efficiency of their breeding programmes. However, many of these technologies are expensive and are mainly used by elite cattle producers who can sell the semen and embryos to other farmers.

The techniques include:

- artificial insemination
- oestrous synchronisation
- embryo transfer
- in vitro fertilisation
- sexed semen

#### **Artificial Insemination**

Artificial insemination (AI) has been used by breeders for hundreds of years although it is only in the last 50 years or so that it has come into widespread use. It involves the collection of semen from bulls which can then be used to artificially inseminate cows. It is also possible to freeze the semen and ship it around the world.

It is mainly used with dairy cattle where a small number of elite bulls can provide semen for thousands of cows. It is less widely used for beef cattle. AI has also been used with pigs, sheep and goats, horses and poultry. It has also been used with endangered species.

#### **Oestrus Synchronisation**

Oestrus synchronisation involves giving hormone implants and injections to ensure a group of cows are ready for breeding at the same time. In one sense, it is a bit like a contraceptive pill in reverse. It is often used in conjunction with AI.

## **Embryo Transfer**

Just as AI is used to produce lots of calves from a single, elite bull, embryo transfer is used to produce more offspring from an elite cow. The elite cow is stimulated with a hormone that causes her to produce a number of eggs at once (instead of just one). She is then mated (either naturally or by AI) and many of the eggs are fertilised and start to develop. A few days later, the embryos are flushed out surgically and implanted into the uterus of surrogate mothers where they are brought to term.

## **In vitro Fertilisation**

This is a similar process to embryo transfer except the unfertilised eggs of the elite cow are fertilised in an incubator before being transferred to recipient cows. This is the same process used in humans, producing so called “test tube babies”.

## **Sexed Semen**

Although this idea has been around for some time, it is only just beginning to be used commercially and at the moment semen produced in this way is more expensive than conventional semen and less fertile. The purpose of this is to produce a higher proportion of a preferred sex of calves. For example in a dairy herd it would be preferable to have a higher proportion of female calves.



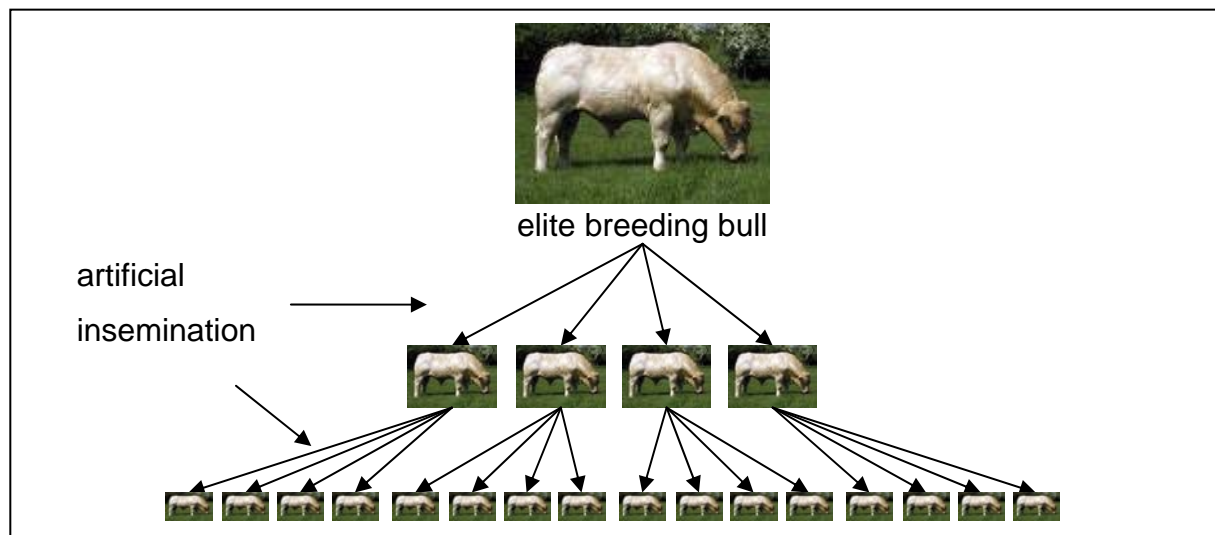
#### 9.5.4 Fact Sheet 4: Cloning Farm Animals – How might it be used?

These days, very few farm animals are produced by traditional mating. Farmers use a number of breeding techniques (see Fact Sheet 3 for further details). Animal cloning provides animal breeders with the possibility of further accelerating the rate of genetic improvement in cattle and other farm animals.

Until now, reproductive cloning using SCNT has been mainly used in the US, Japan and New Zealand where a number of biotech companies are offering reproductive cloning services.

The technology is expensive – a cloned calf might cost \$20,000-\$25,000 which compares with \$50 for a unit of bull semen for artificial insemination. For this reason, reproductive cloning will probably only be used to clone the very best bulls and cows – for example, the ones that produce the most milk or the best beef.

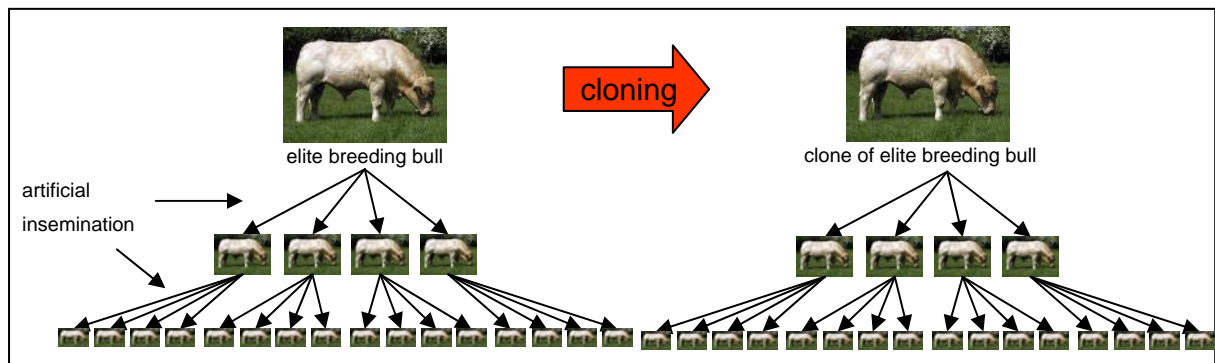
A cattle farmer who owns an elite breeding bull can use sell its semen to hundreds of



other farmers who use it to produce high quality cattle (see Figure 1).

#### **Figure 1: A single elite bull can be used to produce a large number of high quality cattle**

However, he could also clone the elite bull and thereby produce a much greater quantity of semen from which many more high quality beef cattle can be produced (see Figure 2).



**Figure 2: By cloning the bull a larger number of high quality cattle can be produced**

Other reasons why a breeder might consider cloning an animal include:

- to replace a valuable animal that can no longer be used for breeding due to old age, illness or injury. A farmer who identifies an animal with a combination of the best properties could use cloning to produce further animals with exactly the same combination of genes
- to produce a young copy of an animal that has shown desirable properties throughout its productive life, but is too old to be used for breeding
- to produce herds of animals from breeds that have fallen out of popularity and are in danger of disappearing

Outside of farming, animal cloning could be used to duplicate animals that are incapable of breeding, such as geldings that have turned out to be champion racehorses or show jumpers. The cloned animals could then be used to breed further generations.

The cost of the technology means that the majority of farm animals will still be produced using more conventional breeding methods. The difference will be that their parents or grandparents may have been clones.

To date, there is only one known example in the UK of the offspring of a cloned animal – a calf called Dundee Paradise who is the daughter of a cow cloned in the US. Dundee Paradise was imported into the UK as a frozen embryo, implanted into a surrogate mother and delivered at a Midlands farm in December 2006.

## 9.5.5 Fact Sheet 5: Cloning: What are the concerns?

Various concerns have been raised about animal cloning. Organisations and individuals opposed to animal cloning have put forward a number of different concerns and these have been countered by groups in favour of cloning. Both sides present 'facts and figures' to support their position and it can often be difficult to know who is right. We have summarised below the main areas of concern.

### 1. Animal Welfare Concerns

At the moment cloning is an inefficient process. It is claimed that no more than 1-2% of cloning attempts result in a successful birth and that not all of those that are born are healthy enough to survive and live a 'normal life'. It is argued that animals suffer as 'their eggs are harvested' or as they are 'repeatedly surgically implanted with embryos'.

Supporters of cloning would argue that existing breeding methods are not 100% efficient and that as scientists perfect their techniques, the efficiency of cloning is improving. Eggs are often taken from the ova of dead animals in the abattoir (the eggs have their nucleus removed and replaced with the nucleus from a cell from the donor – see fact sheet 1) and that other forms of animal breeding involve implanting embryos into surrogate mothers (see fact sheet 3).

It is also claimed that cloned animals live shorter lives or they have various health problems but again data is hard to come by. For example, Large Offspring Syndrome (LOS), where the cloned animal is significantly bigger at birth, is said to be a 'common problem' with clones and this can cause overly painful labour and delivery for the mother. Contrast this with claims made by supporters of the technology who argue LOS occurs naturally in cattle and while it occurs at higher rates with assisted reproductive technologies, it is not a problem caused specifically by cloning, and is a situation which is improving.

Opponents of cloning would see it as another means of intensive livestock farming – 'to produce animals that grow faster so they can be slaughtered sooner and to raise more animals in a smaller space'. Supporters would see it as the latest in a long line of breeding techniques that enables farmers to produce the very best animals which provide the greatest yields (for example, the amount of milk or beef) and that high levels of production are only of value if the animal is healthy. The aim of breeding is to achieve a high yield coupled with robustness.

### 2. Food Safety Concerns (see fact sheet 6 for more details)

Supporters argue that cloning will almost certainly only be used for making copies of elite animals (see fact sheet 3). Such animals are very costly and will only enter the food chain at the end of their natural lives. So, while a small number of cloned animals could end up in the food chain, consumers will mainly be exposed to food from animals that are the offspring of clones.

In the USA, there has been a voluntary moratorium on clones entering the food chain while the Food and Drug Administration (FDA) conducts a review of the evidence. In a draft ruling, in December 2006 the FDA concluded that there is no evidence to suggest that food products from cloned animals are unsafe.

Opponents of animal cloning argue that there may be concealed or long term health problems with cloned animals which have not yet been detected and these have the potential to pose unexpected food safety risks.

### **3. Consumer Right to Know**

Some people believe that consumers have a right to know what they are eating and to avoid buying or consuming food that offends their religious or moral beliefs. They would argue that food containing material derived from cloned animals should be labelled to this effect.

### **4. Environmental Concerns**

Opponents of animal cloning are concerned that the genetic diversity of farm animals will be greatly reduced which will make them more susceptible to disease and less able to adapt to future environmental changes. Supporters argue that the technique will allow them to breed animals that have the necessary traits to survive and prosper in different environments – for example, if climate change results in warmer, drier conditions in some parts of the world, they will be able to clone animals that have the genetic make-up to cope with these conditions.

It is also argued that cloning can be used to protect endangered species but to date there have been few attempts.

### **5. Ethical Concerns**

For some, cloning is tantamount to 'playing God' and they object to it on religious grounds. Others feel that it fundamentally alters the natural status of the animal and raises serious concerns as to the extent to which society should allow humans to treat animals as 'commodities'. And for some it represents a stepping stone on the path to human cloning and eugenics.

### **6. Cloning Humans**

In theory, there is nothing to stop the same techniques being applied to humans. It has been claimed by a small number of scientists that they have successfully produced a cloned human embryo. Indeed, there have been some unsubstantiated claims that scientists have succeeded in producing a cloned human. For example, Clonaid, the medical arm of a religion called Raëlism, has claimed to have produced 13 cloned children but has failed to produce any evidence in support of their claim.

The current legal situation is mixed. **In the UK** reproductive cloning is illegal. Therapeutic cloning is allowed under license from the Human Fertilisation and Embryology Authority. The first licence was granted in 2004 to researchers at the University of Newcastle to allow them to investigate treatments for diabetes, Parkinson's disease and Alzheimer's disease.

It is likely that each country will have a different position on this.

## 9.5.6 Fact Sheet 6: Is food from cloned animals safe?

Consumers expect all the food that they buy to be safe and this means it is essential to consider whether any new way of producing food might affect its safety.

As explained in Fact Sheet 4, the cost of animal cloning probably means that the majority of farm animals will not be clones. However, they may be the offspring of clones. In addition, cloned animals used for breeding purposes may also end up in the food chain when they die.

### 1. UNITED STATES

The USA is one of the countries where there has been the most research into animal cloning and where cloned animals could first enter the food chain. The Food and Drug Administration (FDA) is responsible for food safety in the United States and it has carried out a lengthy review of the safety of meat and other products from cloned animals.

The FDA published a draft report at the end of 2006, when it concluded that any food products obtained from cloned cattle, pigs and goats were as safe as products from non-cloned animals.

The FDA could not say the same about cloned sheep, however. This was not because of evidence that cloned sheep might be unsuitable for food production, but there was not enough information to draw any meaningful conclusions.

The FDA's 2006 report was issued for consultation and the final version, which will take account of the comments that were received as well as any new information, is likely to be published in December 2007.

If this report concludes that there are no safety problems, then the American livestock industry may decide to start incorporating animals derived from cloned cattle into beef and dairy herds.

### 2. FRANCE

In 2005 the French food safety agency AFSSA published a report on the risks and benefits of cloned livestock. This report concentrated mainly on cattle, but AFSSA considered that its conclusions could also be applied to other farm animals.

At that time, AFSSA reported that only a small number of studies had been carried out to look at the composition of produce from cloned animals. These had shown that meat and milk from the cloned animals was similar to that from other animals. There was however not enough information to draw any general conclusions about the safety and nutritional quality of food obtained from cloned animals, or from their offspring.

This report came out 15 months before the FDA 's interim report (see above) and the FDA was able to consider further information that was not available when the French report was drawn up.

### **3. EUROPE**

The European Food Safety Authority (EFSA) was set up in 2002 to provide advice on food safety and other related issues, and remove the need for all (27) EU Member States to carry out parallel evaluations on common food safety issues. EFSA has recently been asked by the European Commission to examine the implications of animal cloning. EFSA has set up a group of independent experts, drawn from various parts of Europe, who are carrying out this review. Their report is expected to be published in spring 2008. This report will cover food safety as well as other considerations such as animal health and welfare.

### **4. UK**

The Food Standards Agency is the body responsible for the assessment of food safety within the UK (see Fact Sheet 9 for more information).

The Agency is awaiting the EFSA and has no plans to assess the use of animal cloning. However, if a company wanted to get an authorisation to market food produced using cloned animals then the Agency would be obliged to assess the food safety implications.

If it is asked to review foods from cloned animals, the Agency will ask an independent advisory committee (comprising of academic experts) for advice in the safety assessment. This committee is currently actively advising the Agency on a wide range of new foods and food technologies.

## 9.5.7 Fact Sheet 7: Welfare of cloned animals

There is already legislation in place to ensure that the welfare of animals in the UK is maintained at high standards. This fact sheet describes the regulatory requirements, and explains how the legislation may well be sufficiently flexible to protect cloned animals and their offspring, should they be considered for farming purposes.

### 1. The welfare of farmed animals

#### How is the welfare of farm animals protected in the UK?

There is a legislative framework in place to ensure the welfare of animals in the UK and make it an offence to cause suffering to any farmed animal. The legislation also describes a duty of care for these animals, so keepers must take reasonable steps to ensure the animal's welfare needs are met. In addition there are legal requirements in respect of the general welfare, inspection, housing and feeding of all farm animals.

#### How good is the UK's record on animal welfare?

The UK has some of the highest animal welfare standards in the world. In recent years the UK has not only been responsible for implementing higher standards domestically, but has also taken an active role at EU and international level in trying to improve standards.

An example of an improvement in animal welfare is the ban on conventional battery cages for laying hens across the EU by 2012.

#### Who ensures that farmers will abide by the legislation?

This is carried out by Animal Health (formerly called the State Veterinary Service) or the Department for Agriculture and Rural Development in Northern Ireland, who enforce the welfare legislation, and conduct regular programmed inspections of farms to check the welfare of livestock. Animal Health also investigates all complaints and allegations about poor welfare on farms and if appropriate, takes legal action.

### 2. Would the welfare of cloned animals be treated any differently?

The answer to this question is in two parts.

**Firstly, scientific research into the development of cloned animals.** At present there is comparatively little research being carried out in the UK on cloned animals and the vast majority is restricted to research into the use of cloned animals for pharmaceutical purposes.

Cloning, like any scientific procedure on animals, is restricted to research establishments under licence from the Home Office. This legislation protects the welfare of the animals and ensures that they cannot be used for farming purposes. Given the comparative lack of interest in the development of cloned livestock in the UK, we understand that no applications have been made for animals cloned to be released from the scientific environment for farming purposes.

**Secondly, what would happen if a cloned animal, or their offspring were to be used on farms in the UK?**

Firstly the Home Office legislation would require that if released, the animal was not in any way likely to suffer any more than existing farmed animals. Only if this and other criteria relating to the suitability of the animals and techniques involved for a commercial environment are satisfied would the animal be permitted to be released into farming.

Assuming that this has been achieved, there is no reason why the welfare of a cloned animal (which is genetically identical to an existing animal) should require protection additional to that offered to any other animal. Therefore the welfare controls described in Section 1 above would apply equally to a cloned animal, surrogate mother or their offspring.



## 9.5.8 Fact Sheet 8: Barriers to the use of clones in food production

There are number of barriers to the introduction of cloning technology. These include the financial cost of the producing cloned animals and satisfying all necessary legal requirements to ensure that foods such as milk or meat from cloned animals are safe.

### 1. COST

**Farmers make small profits.** Irrespective of what animals are farmed, it is widely recognised that profit margins for farmers are very low. A pint of milk in the supermarket costs about 40p; farmers receive about 10p per pint, a figure that has remained fairly constant for the last decade.

**Cloning is expensive technology.** Whilst the use of cloning technology may mean that the quality or yield of milk improves in, for example, a dairy herd, it is very unlikely that it would be economically viable for a herd to be made up of cloned cows. This is because the high cost of producing a cloned dairy cow is unlikely to be offset by any financial gain to the farmer as a result of improvements in the yield or quality of milk produced.

The use of cloned animals in the food chain will probably be restricted to companies who develop elite breeding herds such as those that provide bull semen for the artificial insemination of a dairy herd. In the future it is possible that dairy herds may include the daughters, or granddaughters of a cloned animal, which was cloned to ensure that a particular trait is passed down through successive generations.

### 2. REGULATION

**Research.** A cloned animal cannot go straight from the laboratory into the food chain. The use of animals in any research including the development of cloned animals is tightly regulated in the UK. The law controls the use of animals for scientific purposes, and restricts their entry into the food chain.

If UK breeders produced a cloned animal that had commercial potential, and it was permitted to be used as a farm animal, both it and any offspring would, like all farm animals, have to be reared in accordance with general animal welfare legislation which ensures that all animals are treated humanely. This would also apply if a farmer, or an elite breeding company looked to import a cloned embryo. See Fact Sheet 7 for more details.

#### **Food Safety**

UK food law requires that any food placed on the market must not present a danger to the consumer.

**Is all the food we eat safe?** Not all food that is on the market in the UK was assessed for its safety before being placed on the market. Indeed, there are a number of well known foods that have been eaten for generations that are not suitable for certain individuals, or that require an understanding of how best to prepare them. In such circumstances we, as consumers, are able to make informed choices based on our level of understanding of the nature of the food (e.g. thoroughly boiling dried beans and pulses) or by reading advisory labels (e.g. peanut allergen labelling).

**What about new foods?** Consumers are not able to make the same informed choices for new foods and there is a system whereby new foods (so called 'novel' foods) are subject to a safety assessment. This has been the case in the UK for over 20 years, and in the last 10 years EU-wide legislation on novel foods has been in place. Under this legislation, no new food can be marketed in the EU before it has undergone an independent safety assessment. This has meant that foods as diverse as *Quorn* and cholesterol lowering margarines (e.g. *Flora pro.Activ*) have been formally assessed for their safety before being placed on the market.

**What would happen for food products from cloned animals (e.g. milk, beef)?** The regulatory process described above would also cover the products of animal cloning. A safety assessment would concentrate on any compositional differences in milk and or meat from cloned animals and determine whether there are any safety, or nutritional concerns. Only when all concerns have been satisfied could the foods be marketed.

The legislation on novel foods also requires that new products are labelled to indicate any differences from existing foods, so that consumers are not misled.

## 9.5.9 Fact Sheet 9: Role of the Food Standards Agency

### **Who are the Food Standards Agency and what do they do?**

The Food Standards Agency (FSA) is an independent Government department set up by an Act of Parliament in 2000 to protect the public's health and consumer interests in relation to food and everything they do reflects their vision of safe food and healthy eating for all.

### **Why are they interested in animal cloning?**

The Agency is aware that in the US the use of cloned animals in the food chain is likely to be approved for certain animals (probably cows and pigs) in early 2008. This may pave the way for the technology to be considered for use in Europe.

The Agency is the UK body responsible for the assessment of new (novel) foods and, in advance of being asked to consider the safety of food produced from cloned animals, is seeking the views of the public regarding the use of the technology.

### **The Agency is not pro- or anti- animal cloning**

The Agency does not have a role in promoting the use of new technologies such as animal cloning. However, it does need to be sure that new approaches to food production do not affect the safety of the food, and that other consumer interests are recognised and addressed. Because it may soon be feasible to clone farm animals, the Agency is seeking the views of the public in order to be able to gain a clear understanding of consumer concerns.

The Agency recognises that the concerns may be in the context of food safety, animal welfare, or the environment, or ethics, or a combination of all these. Understanding consumer concerns will enable them to be in a position to reflect the views of the UK public in any discussions regarding the use of the technology with counterparts across the EU.

Concerns regarding animal welfare and environmental issues are not dealt with by the Agency, but these are the responsibility of another Government Department, Defra.

### ***What can the Agency 'do' about animal cloning?***

Food from cloned animals can only be marketed if it is approved under the regulations on novel foods. The Agency is waiting for the results of the review that is being carried out by EFSA but in the mean time has no plans to assess the use of cloned animals / their offspring in the food chain unless it is asked to do so (see Fact Sheet 8). If a company applied for an authorisation to market food produced using cloned animals then the Agency would be obliged to assess the food safety implications.

If it is asked to review foods from cloned animals, the Agency will ask an independent advisory committee (comprising of academic experts) for advice in the safety assessment. This committee is currently actively advising the Agency on a wide range of new foods and food technologies.

## ***Current Agency position on animal cloning?***

The Agency issued the following statement on animal cloning in January 2007

### **Cloned offspring novel food, says Agency**

Thursday 18 January 2007



The issue of cloned animals and their offspring entering the UK food chain has recently been reported in the media. The Food Standards Agency (FSA) is committed to protecting the public's health and consumer interests in relation to this matter and all food related issues.

Cloned animals fall under the EC Novel Foods Regulation. This means that any product from a cloned animal would be subject to a safety evaluation by all 27 Member States as a novel food before it could be legally marketed.

The Agency is currently in discussion with the European Commission about the legal requirements relating to offspring of cloned animals. The authorisation and labelling of novel foods is decided on a case-by-case basis and no applications have been received to date within the EU for products derived from cloned animals.

The FSA's view is that products from the offspring of cloned animals, like those from cloned animals themselves, should be considered as novel foods.

The Agency expressed this view at an EC discussion group meeting that took place in Brussels on 12 January 2007. The Agency's view was also shared by a significant number of other Member States.

However, the issue will need to be considered fully by the Commission before it is discussed at a meeting of the Standing Committee and a decision made.

The Commission intends to put this issue forward for discussion as soon as possible and the FSA is pressing for this to happen as soon as possible, together with referral of this issue to the European Food Safety Authority for advice on consumer safety.

FSA officials are also in liaison with Defra about the import of embryos from cloned animals into the UK and the monitoring of cloned animals and their offspring.

### 9.5.10 Fact Sheet 10: Sources of further information

There is plenty of information about animal cloning available on the internet. We have listed a few sites we think are useful starting points but please do your own research and follow up the issues in which you are most interested or where you have particular concerns or questions.

#### **What is cloning?**

Radio 4 broadcast two programmes on cloning in August of this year. You can listen again to these at <http://www.bbc.co.uk/radio4/science/peasinapod.shtml>

The BBC have also provided an explanation of cloning at <http://news.bbc.co.uk/1/hi/sci/tech/5098286.stm>

The next website provides a very clear and simple explanation of cloning aimed at a non-specialist audience; you can even carry out a simulated cloning of a mouse! <http://learn.genetics.utah.edu/units/cloning/>

If you would like a more technical explanation, you could try <http://en.wikipedia.org/wiki/Cloning> and [http://en.wikipedia.org/wiki/Somatic\\_cell\\_nuclear\\_transfer](http://en.wikipedia.org/wiki/Somatic_cell_nuclear_transfer)

#### **Dolly – the first cloned sheep**

There is no shortage of information about Dolly. You might like to visit the Roslin Institute's website at <http://www.roslin.ac.uk/publicInterest/cloning.php>. The Science Museum has an interactive website devoted to Dolly which you can find at <http://www.sciencemuseum.org.uk/antenna/dolly/index.asp>

You might also like to visit the website of the Research Defence Society, a UK organisation representing medical researchers in the public debate about the use of animals in medical research and testing: [http://www.rds-online.org.uk/pages/page.asp?i\\_ToolbarID=5&i\\_PageID=162](http://www.rds-online.org.uk/pages/page.asp?i_ToolbarID=5&i_PageID=162) offers a short piece on cloning and Dolly. This article also looks at some of the ethical issues associated with animal cloning.

#### **Current Breeding Techniques**

A recent review of the main techniques is available at <http://www.thecattlesite.com/articles/895/the-current-status-of-applied-reproductive-technologies-for-beef-cattle>

A description of artificial insemination and oestrous synchronisation is at <http://www.thecattlesite.com/articles/952/natural-service-versus-estrous-synchronization-and-ai>

Embryo transfer is described at <http://www.fao.org/DOCREP/004/X6500E/X6500E03.htm>

## Cloning Farm Animals

<http://geneticsandsociety.org/article.php?id=115> and <http://news.bbc.co.uk/1/hi/sci/tech/6288814.stm> outline how cloning of farm animals is being used in the USA.

There is no shortage of news coverage of Paradise Dundee – the only offspring of a cloned animal known to be present in the UK – just put her name into your preferred search engine.

## What are the Concerns?

<http://www.endanimalcloning.org/index.shtml>, [http://www.ciwf.org.uk/publications/reports/farm\\_animal\\_genetic\\_engineering\\_and\\_cloning\\_summary\\_2002.pdf](http://www.ciwf.org.uk/publications/reports/farm_animal_genetic_engineering_and_cloning_summary_2002.pdf) and <http://www.tacd.org/cgi-bin/db.cgi?page=view&config=admin/docs.cfg&id=308> set out many of the arguments and concerns against animal cloning

<http://www.clonesafety.org/cloning/> is sponsored by biotech firms involved in developing animal cloning techniques and sets out arguments in support of cloning.

[http://en.wikipedia.org/wiki/Human\\_cloning](http://en.wikipedia.org/wiki/Human_cloning) sets out the position regarding human cloning

## Is Food from Cloned Animals Safe?

There is a considerable amount of information on the US Food and Drug Administration website about animal cloning.

A copy of a press release announcing the draft findings of their review can be found at <http://www.fda.gov/bbs/topics/NEWS/2006/NEW01541.html>

If you want to read the full report, it is available at <http://www.fda.gov/cvm/CloneRiskAssessment.htm>

The site also provides some useful summaries about animal cloning such as

[http://www.fda.gov/cvm/CloningRA\\_Primer.htm](http://www.fda.gov/cvm/CloningRA_Primer.htm)

[http://www.fda.gov/cvm/CloningRA\\_FAQConsumers.htm](http://www.fda.gov/cvm/CloningRA_FAQConsumers.htm)

[http://www.fda.gov/cvm/CloningRA\\_Myths.htm](http://www.fda.gov/cvm/CloningRA_Myths.htm)

## Welfare of Cloned Animals

Animal Welfare information can be found at:

<http://www.defra.gov.uk/animalh/welfare/default.htm>

## Role of the Food Standards Agency

Information about the FSA can be found at their website: <http://www.food.gov.uk/>

## 9.6 What Do We Know About Public Opinion?

In preparing for this research project, a preliminary internet search was conducted using the Google search engine and the key words “animal cloning” + “public opinion”. This was done partly to establish what information already exists about the public’s knowledge of, and attitudes towards, animal cloning in order to have a better idea of where respondents might be starting from. It also identified the sort of information respondents might discover if invited to carry out their own research into the subject. This initial search highlighted two key things:

- there has been considerable public opinion research conducted in the US but very little in the EU; this research all seems to point in the same direction
- there is a wealth of websites offering information and opinion on the subject matter including some sites that are promoting animal cloning (e.g. <http://www.clonesafety.org/cloning/>) and others that are in outright opposition (e.g. <http://www.endanimalcloning.org/index.shtml>).

Not surprisingly, given that animal cloning is more developed in that country, much of the research has been carried out in the US. There is a consistent picture from a number of opinion polls conducted over the past few years that the majority of Americans consistently oppose animal cloning. For example, a survey carried out on behalf of the American Antivivisection Society in 2006<sup>14</sup>, found that 66% disapprove of cloning animals for food and this figure increased to 88% when respondents were told that cloning involves animal suffering.

Other findings include:

- 79% are unsure about the safety of food from cloned animals<sup>15</sup>
- 63% would not buy cloned food even if it were labelled as "safe."<sup>16</sup>

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<sup>14</sup> Cited by <http://www.endanimalcloning.org/publicopinion.shtml>

<sup>15</sup> Pew Initiative on Food and Biotechnology, 2006 cited by <http://www.endanimalcloning.org/publicopinion.shtml>

<sup>16</sup> [Dairy industry support continued FDA ban on selling cloned-cow milk \(2005, July 15\)](#). *Washington Times*. Cited by <http://www.endanimalcloning.org/publicopinion.shtml>

- 87% think the US Government needs to ensure that the ethical issues related to animal cloning are publicly discussed before allowing cloned animals to be sold as food. (AAVS, 2006 survey cited above, see footnote 13).

In their review of 17 opinion polls published between 2000 and 2006, Hallman and Condry<sup>17</sup> concluded that *“most Americans, Canadians, and Europeans have heard of cloning but say they know little about it. Most also have limited knowledge about the basics of genetics, and little familiarity with both biotechnology and conventional breeding practices”*. Importantly from the point of view of the current research, the authors argue that *“the opinions they (i.e. survey respondents) express are more likely to reflect their first impressions of the topic rather than indicative of a position developed over time that has been deliberated or supported by a concrete system of beliefs and attitudes”*. This supports the idea that a deliberative approach is appropriate in order to go beyond initial impressions and to seek to establish how the public’s attitudes are shaped in the light of the available evidence.

Hallman and Condry<sup>18</sup> also conducted ten depth interviews with *“well educated opinion formers”* to explore the mental models people have about cloning and how they engage with the issues. This also sheds some interesting light on the matter. Their respondents tended to engage with the subject matter at an emotional level (is it a good or a bad thing?) rather than at a rational level (what is it, what is it designed to do?). While they could identify potential benefits, few felt the benefits applied to themselves. They were far more likely to identify concerns such as potential unintended consequences, unknown long term problems, lack of trust in science, business or government, and ethical issues. Interestingly, when asked what they would like to know about animal cloning, ‘how it works’ was rarely mentioned. Instead, respondents were more interested in answers to questions such as:

- who is doing it? where? what are the goals and objectives of the research? what is the current status of the research?

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<sup>17</sup> Hallman, W. K., & Condry, S. C., (2006). Public Opinion and Media Coverage of Animal Cloning and the Food Supply: Executive Summary. Food Policy Institute. Rutgers, the State University of New Jersey, New Brunswick NJ, 08901. FPI Research Report: RR-1106-011

<sup>18</sup> *Ibid*



- what are the risks and benefits to consumers and to the cloned animals themselves?
- what are the ethical, moral, and philosophical arguments for and against cloning?
- who is monitoring/regulating the technology? is the technology safe?
- are the cloned animals normal (i.e. are they really identical to non-cloned animals)? what kinds of problems, if any, do cloned animals experience? how does cloning work? what happened to Dolly?
- is food from cloned animals safe to eat? are we already eating such food products?

There is considerable overlap between the above list of questions and the main types of concerns identified by other organisations interested in animal cloning<sup>19</sup> including:

- animal welfare concerns
- food safety concerns
- environmental concerns
- ethical concerns
- concerns about the consumer's right to know.

Compared to the situation in the US, there appears to be a paucity of information about the state of knowledge and attitudes among the UK public. A Eurobarometer survey conducted in 1999 explored public attitudes towards biotechnology in general, including animal cloning<sup>20</sup>. For example, this found that public attitudes had become more negative since an earlier survey in 1996 and that cloning aroused negative feelings,

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<sup>19</sup> For example, <http://www.endanimalcloning.org/faq.shtml> and Trans Atlantic Consumer Dialogue, Doc No Food-28-07, February 2007

<sup>20</sup> <http://ec.europa.eu/research/rtdinfo/en/27/genome04.html>

especially in France, Greece and the UK. The study also reports on a gender difference, with women being more negatively predisposed towards cloning than men.

There are also parallels with the recent GM debate. Just as GM food was seen by some as mainly benefiting a small number of private companies seeking to make large commercial gains, some critics of the FDA's draft risk assessment have argued that they have been unduly influenced by two animal cloning companies, Cyagra and ViaGen: *"The surface agenda the FDA addresses is public safety [ ]; the agenda hidden in plain sight is that of commercial interests."*<sup>21</sup>

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<sup>21</sup> <http://geneticsandsociety.org/article.php?id=2053>