

ROADMAP

Rethinking of antimicrobial decision-systems in the management of animal production

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D2.4 Paper or report on innovative theoretical framework for qualitative social sciences work in the research on AMU

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About the ROADMAP research project

The overall aim of ROADMAP is to **foster transitions towards prudent use of antimicrobials (AMs) in animal production in different contexts to manage antimicrobial resistance (AMR). Prudent antimicrobial use (AMU) will be achieved by enhancing antimicrobial decision-systems along the food and drug supply chains.** ROADMAP will focus on supporting animal health and welfare through prevention and health promotion actions.

AMR is recognized as a significant threat to global public health and food security. Overuse and improper use of AMs in many parts of the world contribute to the emergence and spread of AMR. Although human and animal health require AMs, it has been estimated that two thirds of the future AMU growth worldwide will be in animal production. Improving the management of AMU in farm animals is therefore a critical component of dealing with AMR and optimizing production in the livestock sector. Nevertheless, the variety of contexts of AMU in the livestock sector is a major challenge to managing AMR. **There is no “one-size-fits-all” solution to improve AMU and strategies must be contextually developed** (for instance, strategies used in the Danish pig industry are difficult to adapt and adopt in the French free-range poultry farming). Successful solutions must be combined and tailored to the production systems and the social and economic context in which they operate.

ROADMAP will meet three general objectives, in line with the EU AMR Action plan: i) **Rethink AM decision-systems and animal health management;** ii) **Develop options for encouraging prudent AMU in animal production;** iii) **Engage all actors in the food and drug supply chains in fostering a more prudent use of AMs.**

Project consortium

Part. N°	Participant organisation name (acronym)	Country
1	Institut National de Recherche pour l'Agriculture, l'Alimentation et l'Environnement (INRAE) **	France
2	Association de coordination technique agricole (ACTA) ***	France
3	Centre de coopération internationale en recherche agronomique pour le développement (CIRAD) **	France
4	University of Liverpool (ULIV) *	United Kingdom
5	Cardiff University (CU) *	United Kingdom
6	James Hutton Institute (HUT) **	United Kingdom
7	Alma Mater Studiorum - Università di Bologna (UNIBO) *	Italy
8	Aarhus Universitet (AU) *	Denmark
9	Eigen Vermogen van het Instituut voor Landbouw en Visserijonderzoek (EV-ILVO) **	Belgium
10	Research Institute of Organic Agriculture (FiBL) **	Switzerland
11	Stichting Wageningen Research (WR) *	Netherlands
12	Swedish University of Agricultural Sciences (SLU) *	Sweden
13	Southern Agriculture and Horticulture Organization (ZLTO) ***	Netherlands
14	European Forum of Farm Animal Breeders (EFFAB) ****	Netherlands
15	Fundacion Empresa Universidad Gallega (FEUGA) ****	Spain
16	Dierengezondheidszorg Vlaanderen (DGZ) ***	Belgium
17	INRAE Transfert (IT) ****	France

* *Universities/veterinary schools*

** *Research institutes specialized in both fundamental and applied agricultural and veterinary sciences*

*** *Public and private advisory services Organisations*

**** *Knowledge transfer and Innovation organisations*

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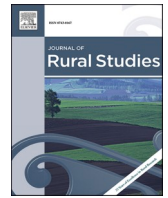
Executive Summary

This deliverable comprises a peer reviewed journal article, which utilises a novel theoretical framework for addressing antimicrobial use. The journal article “‘Natural born carers’? Reconstituting gender identity in the labour of calf care: Farmer concern about antimicrobial use” was published in the Journal of Rural Studies, Issue 95 in 2022. The Journal of Rural Studies is well respected in the field of rural geography, with an impact factor of 5.157. <https://www.sciencedirect.com/journal/journal-of-rural-studies>

The paper draws on the RoadMap conceptual framework sections on ‘triggering change’ and the ‘good farmer’. The paper demonstrates how the marginal nature of (low value) calves intersects with the marginal nature of their caregivers (largely women who are not the primary decision-maker on the farm) to produce barriers to changes in antimicrobial use. There are thus important gender dimensions to antimicrobial use: women are seen as ‘natural born caregivers’ and assigned or take on the role of calf care, but with limited power over the medications which are available to them. The paper demonstrates that caring for the calves can be part of caring for the farm as a whole – i.e. as a survival strategy.

The paper has been published open access: <https://www.sciencedirect.com/science/article/pii/S0743016722002327>

1.1. Journal Article



‘Natural born carers’? Reconstituting gender identity in the labour of calf care

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ABSTRACT

Environmental crises and agricultural policy reforms are key moments for the reorganisation of farming practices, which can contribute to the reconstitution of female farming roles and identities. In this paper, we consider the role of animal disease in providing an opportunity to reconstitute female farming identities, particularly emphasising female farm employees. Focusing on the careers and labour of calf rearers, the paper shows how calf rearing identities are structured and contested, and linked to cultures of care that are shaped by patriarchal farming relations. Drawing on 25 biographical interviews, the paper reveals four distinct narratives of calf rearing: natural born carers, rescue, taking back control, and from outsider to insider. Despite significant changes to the organisation of animal health and welfare for calves, these narratives reveal the marginal status of both calves and calf rearers. Calf rearers’ labour of care encompasses both affectual attachments to calves but also family and farm relationships, reflecting how careful rearing is configured by the material and cultural relations of farming. Whilst some calf rearers have been able to challenge these relationships and reconstitute calf rearing identities, the narratives suggest that calf rearers lack agency to change animal health practices. Awareness of these gendered dimensions to calf rearing and animal health is vital for policy makers seeking to improve the health of livestock.

1. Introduction

Since the 1980s, various studies have described how women’s roles in farming are determined by patriarchal structures and discourses of hegemonic masculinity (Gasson, 1980; Whatmore, 1991; Brandth, 2002; Liepins, 2000). Male inheritance of land and female under-representation within farming organisations limits farm careers through ‘occupational closure’ (Shortall et al., 2020). Although women drive tractors and engage in ‘real’ (physical) farm work, farmers wives’ and daughters’ primary responsibilities often lie with the family, or in off-farm work and they are understood as ‘helpers’ rather than farmers. Recently, a number of studies have sought to explore the evolution of patriarchal structures in farming (Riley, 2009a; Annes et al., 2021) and the extent to which female farmers are able to contest them using their own agency, or what Byrne et al. (2014) refer to as ‘reconstitutive feminisation’. Studies have therefore looked at the potential of disruptions to provide opportunities in which gender relations are restructured such as reforms to agricultural policy (Cush et al., 2018), economic crisis (Newsome, 2020), the introduction of new technologies (Hay and Pearce, 2014) and climate change (Alston and Whittenbury, 2013).

This paper contributes to these debates in two ways. Firstly, the

paper explores how ongoing changes to the management of livestock in response to outbreaks of animal disease and concerns about animal health and welfare may provide opportunities for gendered agricultural identities to be contested and restructured. Studies of the management of existing and emerging animal diseases and health concerns have shown how they result in significant economic (Franks et al., 2003; Bennett and Phillipson, 2004) and social impacts (Convery et al., 2008; Jaye et al., 2021, 2022), and changes to farming practices (Rees et al., 2021). However, there is limited research that examines the gendered dimensions to the management of animal health and disease, or how concerns about animal health and disease contribute to the restructuring of gender relations within agriculture. Secondly, whereas previous studies examine gender restructuring through the identity of a ‘farmer’ (i.e. farm owner) (Sheridan and Newsome, 2021; Newsome, 2020; Shortall, 2002; Kelly and Shortall, 2002), this paper focuses on farm labour the intersecting marginalities that can connect particular human and nonhuman farm actors. Although there is a growing literature on newcomers to farming, this has tended to focus on farm owners; entrance to the sector of farm employees is rarely considered (e.g. McDonald et al., 2014; Zagata and Sutherland, 2015; Deming et al., 2019; Bruce, 2019; Eistrup et al., 2019; Sutherland and Calo, 2020).

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Building on this work, the paper examines the careers of and pathways to becoming a calf rearer, which have largely been ignored within studies of farm labour. Calf-rearing and calf care, as understood through this paper, incorporates a variety of different systems and arrangements, including the rearing of dairy replacements on farm, and specialist arrangements rearing male calves surplus to dairy systems as beef. Calf rearers provide critically important labour, caring for calves at a life-stage when they are particularly vulnerable to infection and ill health, the repercussions of which can affect the short and long-term health of both individual animals and the wider herd. This maternal labour has meant that calf rearing is highly gendered, whilst the fact that their value is less than adult livestock means both occupy marginal positions on the farm. However, global health concerns such as anti-microbial resistance and the emergence of new infectious diseases, may help to de-marginalise calves and those who care for them, challenging traditional farming gender roles. In focusing on the gendered dimensions of calf rearers' labour, the paper also contributes to recent debates about the role of care in agricultural practices (Krzywoszynska, 2016), revealing how different cultures of care are implicated in the labour of calf rearing and female farming identities.

The paper begins by firstly conceptualising how livestock disease may act as a 'trigger event' (Sutherland et al., 2012) to disrupt traditional agricultural gender relations in relation to calf rearing. Secondly the paper draws on 25 biographical interviews with calf rearers to identify four narratives of calf rearing careers. Thirdly, analysis of these career narratives reveals the extent to which traditional patriarchal farming identities are challenged. Finally, the paper discusses the implications of these findings for animal health and disease management policies.

2. Triggering agricultural change and gender restructuring

In conceptualising transitions in farming practices, Sutherland et al. (2012) highlight the importance of trigger events that are able to disrupt socio-technical systems of agriculture that create and guide dominant modes of agricultural production. The potential system disruptions identified by Sutherland et al. include events such as farm succession, changes to family composition, and/or the break-up of business partnerships. Depressed markets may provide economic disruptions, whilst environmental disruptions may include flooding, drought, as well as the spread of new or endemic diseases. The effect of these disruptions is to trigger the realisation that 'system change is necessary to meet farm management objectives' (Sutherland et al., 2012: 144). However, trigger events must be powerful enough to overcome the path-dependency or inertia of these systems which resist change. Reliance on particular technologies can 'lock-in' intensive modes of production, making transitions to alternative modes difficult and unattractive (Levins and Cochrane, 1996). These forms of technological path-dependency are also tied to socio-cultural beliefs about appropriate modes of agriculture. Thus, in these socio-technical relations, beliefs about what constitutes 'good farming' (Burton et al., 2021) and how it is objectified in productive landscapes of machinery and neat hedgerows provide resistance to alternative modes of farming (Burton, 2004). At the same time, these cultural beliefs also shape who can farm and what roles farming family members should play. Thus, in the context of female farm employment, these forms of cultural path-dependency contribute to what Shortall et al. (2020) refer to as 'occupational closure': the process by which women's career entry and progression is limited by discriminatory practices within agricultural systems. For example, the repetition of cultural scripts to justify specific farm work for women reflects how gender is not a fixed category but requires constant work and evolves over time (Leckie, 1996: 309). The kinds of disruptive events that lead to changes in farm practice may therefore also trigger restructuring of gender roles and relations within agriculture. Byrne et al. (2014; Cush et al., 2018) refer to this process as 'reconstitutive feminisation' in which changes to female identities

reflect societal changes and the agency of women to negotiate and produce new identities for themselves, with help from male farming partners. Similarly, Pini (2005, 2008) refers to 'progressive feminisation' in which women actively create new female and agricultural identities.

Progressive or reconstitutive feminisation may provide a significant disruption to trigger change within farming systems in a number of ways. Firstly, in relation to farm succession and/or entering farming, Cush et al. (2018) discuss how new forms of farm ownership are associated with women being able to enter farming in the position of 'farmer', and have increasingly equitable relationships that are reinforced by men (cf. Newsome, 2021). However, other studies of new entrant schemes find they perpetuate male dominance of agriculture (McDonald et al., 2014, 2016). Succession is predicated on gendered socialisation from an early age, with farmers' sons steered towards farm work whilst daughters are encouraged to work in off-farm roles and education (Fischer and Burton, 2014; Chiswell, 2018). Whilst succession might seem highly path-dependent in which first born males are 'born-to-be-farmers', Chiswell and Lobley (2018) suggest that farmers' daughters are increasingly confident in their plans for succession. However, the extent to which women's succession plans are realised requires further research (Pilgeram and Amos, 2015).

Secondly, regulatory, technological and economic changes to farming structures may trigger changes in gender identity. Riley (2009a) suggests that through mechanisation, the increasing bureaucratisation of farming and advent of agri-environmental policies, women on farms have occupied a crucial 'translation' role in which they became central to decision making, leading to new gender identities (see also Bryant, 1999; Evans and Ilbery, 1996). For Newsome (2020), female farmers are 'uniquely positioned to respond to increasing consumer demand for alternative food' and 'more likely to engage in sustainable and alternative agriculture'. Kelly and Shortall (2002; Shortall, 2002) argue that reforms to the Common Agriculture Policy (CAP) and the economic decline of farming are associated with increased off-farm employment amongst women to maintain the family farm (see also: Seuneke and Bock, 2015). Nevertheless, whilst these changes may challenge the gendered nature of farming as a masculine endeavour, these studies also suggest that there is limited renegotiation of female roles which 'keeps farming male' (Bryant, 2003; Hay and Pearce, 2014).

Thirdly, environmental triggers such as extreme weather and flooding, and longer-term environmental change associated with climate change may contribute to reconstituted gender identities (Mehtar et al., 2016; Chandra et al., 2017; Carr and Thompson, 2014). Margaret Alston's (2010) research on climate change and drought in Australia provides a significant insight into their potential to restructure gender relations in agriculture, describing how drought policies have increased on and off-farm employment, but have also served to reinforce gender roles on farms. Policy discourses of drought, for example, fail to acknowledge women's taken-for-granted labour. This perpetuates the 'historical ignorance of women's farm work, resulting in a lack of understanding, limited official acknowledgement, and a subsequent discounting of the labour contribution of women to agriculture' (Alston et al., 2018: 12). Changes to women's roles form farm survival strategies which are underpinned by a dominant masculine hegemony leading Alston and Whittenbury (2013) to suggest that any reshaping of traditional gender relations takes place by developing new roles that are physically or mentally distant from the farm.

3. Restructuring gender identities through animal health

It is clear from social studies of animal disease management, that their economic and social consequences disrupt the nature of farm business, triggering changes to the disease prevention and biosecurity practices used to manage livestock. These impacts may prompt exit and farm succession, or changes to farm business structures to adapt to disease threats (Jaye et al., 2022; Lehane, 1996). It is not just large-scale

disease outbreaks that have potential to reconfigure farm systems: as [Hinchliffe et al. \(2016\)](#) argue, the emergence of new infectious diseases and global concerns of anti-microbial resistance has meant animal disease is seen as an ‘emergency in waiting’. The concept of biosecurity encapsulates this state of anticipation: measures and policies seek to reduce risks, and mobilise new biosecure subjectivities and forms of citizenship to instill a sense of readiness ([Barker, 2010](#); [Shortall and Brown, 2020](#)). In this context, the biological and socio-cultural dimensions of some aspects of livestock farming may also contribute to a rethinking of gender roles in farming. In calf rearing, for instance, calves are inherently vulnerable to disease pathogens as they lack a developed immune system. At the same time, calf-rearing is a highly gendered farming practice, meaning the impact of changing on-farm gender roles may be particularly apparent in the calving shed.

The act of calving fits within displays of masculine strength and dominance consistent with other agricultural and veterinary identities ([Knights and Clarke, 2019](#)). Veterinary books, television shows and farming handbooks historically associate calving with physical strength, picturing male vets stripping off bare chested to cope with the physical labour (see [Straiton, 1965](#)). By contrast, calf rearing is often associated with the apparently natural maternal and caring instincts of the female farmer whose emotional labour is equally valuable within the home and the calving shed. As [Pilgeram \(2007\)](#) notes, gender expectations have a strong influence on how women treat animals which results in the need for women to perform established gender roles to fit in with a male dominated agricultural world. At the same time, [Finan \(2011\)](#) shows how female farmers can strategically use visible performances of feminine care to claim for themselves a unique position within livestock production. Care can broadly be understood as referring to attentiveness, competency and reflexivity that emerges through experiential and choreographed practices ([Krzywoszyńska, 2016, 2019](#)) that are mutually affective, shaping both humans and animals through the embodied interactions, intimate relations and material environments that constitute farming ([de la Bellacasa, 2010](#)). However, practices of ‘care’ may also intersect with various agricultural concerns around food production, ecological and biological (in)securities ([Krzywoszyńska, 2016](#)), leading to tensions between ‘good farming’ ideals and affective practices that can be understood as ‘care-full’. Indeed, the success of the strategies of care revealed by [Finan \(2011\)](#) are dependent on establishing alterity to conventional livestock production, thereby reducing problems of role conflict. Thus, for conventional livestock production it is unclear how affectual forms of care enter into agriculture, and the performance of different forms of care contribute to gender relations.

What is clear, however, is that changes to the management of calves dairy farming to prevent ill-health and disease are likely to disproportionately affect female farm workers who traditionally have been tasked with calf rearing ([Palczynski et al., 2021](#)). Opportunities may therefore exist for gender relations to be reshaped or existing roles entrenched. In relation to our specific case study, calf rearing practices may evolve in direct response to disease threats and outbreaks on farms. For example, to prevent the transmission of John’s disease between mother and calf, calves are removed from their mothers after calving and fed replacement colostrum. This process requires careful preparation using tools such as a refractometer to ensure colostrum is of sufficient quality. Other ‘anticipatory logics’ ([Anderson, 2010](#)) – socio-technical practices designed to prevent or pre-empt the effects of future disease events – have also restructured the dairy industry ([Helliwell et al., 2020](#)). As with other aspects of farming, dairy farming has become increasingly specialised, with the various stages of dairying subject to increasing spatial segregation. As noted above, for milk production and disease prevention, calves are routinely separated from their mothers early in life and housed in dedicated calf housing. Alternatively, dairy calves may be reared off-farm by contracted calf rearers and returned to the main herd when they are ready to join the milking herd. Male dairy calves may be reared for beef or, if they are perceived to have no economic value, euthanised after birth.

Concern amongst consumers, supermarkets and milk processors about the welfare of dairy calves is leading to greater emphasis being placed on good calf rearing ([Palczynski et al., 2022](#); [Bolton and von Keyserlingk, 2021](#)). In the UK, milk processors and supermarkets have introduced regulations that no longer allow dairy calves to be euthanised within the first eight weeks of life. This both contributes to the need for good calf rearing on farm, but also expands the dairy to beef market thereby creating more opportunities for dedicated calf rearing. New companies have therefore been established to collect dairy calves and distribute them directly to farms where they are reared to contract, or indirectly to farmers via a ‘collection centre’ where they are bought to rear independently.

Practices of disease management and prevention reorganise agricultural space in two ways. Firstly, hygienic modes of biosecurity promote the use of dedicated modern calf rearing facilities. Separate facilities may be constructed on farm for calves, or calves may be housed off-farm in dedicated rearing units. Secondly, the impact of regulatory restrictions associated with diseases like bovine tuberculosis (bTB) contributes to strategies of ‘anticipatory mobility’ to manage economic risks. Whilst dairy calves are less likely to be directly affected by bTB ([Brooks-Pollock et al., 2013](#)), when a herd tests positive for bTB, the whole herd is placed under movement restrictions meaning no animal can leave the farm unless it is direct to slaughter. Cattle can therefore become stuck on a farm, unable to move on to locations where they are reared or finished prior to slaughter. In consequence, farms become at risk of overstocking and need to provide feed for animals that cannot be sold. Coping strategies may include dividing the herd into separate holdings or epidemiological units to avoid the effects of movement restrictions for one part of the herd, such as calves.

Another effect has been to create, professionalise and promote occupational roles associated with calf rearing. Support and training for these roles has come from established industry organisations who have developed specific guidance and advice on calf rearing ([AHDB, 2018](#)). Other advice and support has come from new informal peer group organisations such as ‘Women in Dairy’ (www.womenindairy.co.uk) to bring together women working in the dairy industry to share and exchange knowledge. These advisory groups, together with veterinary and pharmaceutical companies have worked together to professionalise and upskill calf rearing by developing calf rearing resources, increase its visibility, and also address other systemic disease management issues, such as the over-use of anti-microbial medicines to manage the threat of anti-microbial resistance ([Palczynski et al., 2022](#)).

4. Methodology

To analyse the association between gender, farming practices and the management of livestock health and disease, research focused on the careers of calf rearers (i.e. how they began calf rearing and the subsequent experiences of it) in England and Wales. Calf rearers were identified with help from key veterinary and industry actors, and social media, followed by snowball sampling to ensure the participation of calf rearers from different farms (dairy/beef) and systems (home-bred and contract rearers). Details of research participants are shown in [Table 1](#). Following previous research on gender restructuring in farming ([Riley, 2009a](#); [Cush et al., 2018](#)) and farmers’ disease management practices ([McAloon et al., 2017](#); [Chan and Enticott, 2019](#); [McFarland et al., 2020](#)), interviews employed [Wengraf’s \(2004\)](#) Biographical Narrative Interpretative Method (BNIM). The BNIM is a semi-structured qualitative interview technique designed to elicit narratives of how changes occur and unfold in specific contexts as seen from an individual’s own perspective. For this research, the BNIM was used to allow research participants to reflectively think through their entry to calf rearing and experience of animal health decisions over time in order to reveal their contextual and situated nature. This reflective process emphasises the importance of the discursive consciousness in capturing the multi-faceted nature of decision-making, as opposed to the practical

Table 1
Participant characteristics.

Participant number	Name	Principal Role(s)	Farm Type	Farm management model	Herd Size	Calving Model	Notable health challenges
1	Lindsey	Joint Partner/Farm manager on family farm	Mixed (including dairy and beef)	Owned	200	Year round calving, more than 150 dairy replacements	TB, Pneumonia
2	Naomi	Full-time employed calf rearer (paid)	Dairy	Tenant	217	Spring Calving Block, more than 150 dairy replacements	Scours, Coccidiosis
3	Lucy	Full-time off-farm work/ Calf rearer on family farm (unpaid)	Mixed (including specialist dairy calf to beef rearing enterprise)	Owned	100	Calves purchased to rear, less than 150/year	Pneumonia
4	Jamie	Joint partner/Farm manager on family farm	Mixed (including dairy and beef)	Owned	45	Autumn calving block	joint infection
5	Abbie	Full-time off-farm work/ Calf rearer on family farm (unpaid)	Dairy	Owned	220	Year round calving, less than 150 dairy replacements	Cryptosporidium, Pneumonia
6	Helen	Joint partner/Full-time calf rearer	Mixed (including specialist dairy calf to beef rearing enterprise)	Owned	n/a	Calves purchased to rear, more than 150/year	Pneumonia, Mycoplasma, Scours
7	Fiona	Joint Partner/Full-time calf rearer	Dairy	Owned/tenant	240	Year round calving, more than 150 dairy replacements	Pneumonia
8	Dawn	Joint partner/Full-time calf rearer	Dairy (including dairy calf to beef finishing enterprise)	Owned/tenant	570	Autumn calving block	Cryptosporidium, Pneumonia, Salmonella, Scours
9	Chloe	Full-time employed calf rearer (paid)	Dairy	Owned	600	Spring and Autumn calving Block. More than 150 dairy replacements.	Pneumonia
10	Leah	Full-time farm trust manager and calf rearer	Mixed (multi-farm trust including dairy and beef farms)	Owned	810 (over three farms)	Continuous calving block	Pneumonia
11	Carol	Full-time employed calf rearer (paid)	Specialist dairy calf to beef rearing and finishing enterprise	Tenant	n/a	Bought in	Mycoplasma
12	Ellen	Full-time off-farm work/ CCalf rearer on family farm (unpaid)	Dairy	Tenant	230	Continuous calving block. Less than 150 dairy replacements.	Cryptosporidium, Pneumonia, Scours
13	Michelle	Joint partner/Full-time calf rearer	Dairy	Owned	530	Continuous calving block. More than 150 dairy replacements.	Cryptosporidium, Rotavirus, Scours
14	Frances	Joint partner/Farm manager on family farm	Mixed (including beef suckler)	Owned	60	Spring Block	None
15	Rebecca and Ben	Joint Partners/farm managers on family farm	Beef suckler	Owned	40–50	Spring Block	BVD, Johnes
16	Amber	Full-time employed calf rearer (paid)	Dairy	Owned	530	Continuous calving block. More than 150 dairy replacements.	Cryptosporidium, Rotavirus, Scours
17	Tanya	Full-time off-farm work/ Calf rearer for own enterprise	Specialist dairy calf to beef rearing enterprise	Tenant	n/a	Bought in	Scours
18	Eleanor	Full-time off-farm work/ Calf rearer on family farm (unpaid)	Dairy	Tenant	376	Spring Calving Block, more than 150 dairy replacements	Johnes, Salmonella
19	Bethan	Farm manager	Beef suckler	Owned	93	Spring Block	
20	Zoe	Full-time off-farm work/ Part-time calf rearer (paid) and on family farm (unpaid)	Mixed (including beef and dairy)	Owned	600 and 60	Continuous dairy calving block and spring block for beef. More than 150 dairy replacements.	Cryptosporidium, Pneumonia, Salmonella, Scours
21	Hayley	Joint partner	Beef suckler	Owned	180	Spring block	Pneumonia
22	Vanessa	Full-time calf rearer for own enterprise	Specialist dairy calf to beef rearing enterprise	Owned/tenant	n/a	Bought in	Pneumonia
23	Katie	Full-time off-farm work/ Calf rearer on family farm (unpaid)	Dairy	Owned	300	Spring Calving Block, more than 150 dairy replacements	Pneumonia
24	Sam	Calf rearer on family farm (unpaid)	Dairy	Tenant	600	Spring Block	Pneumonia
25	Gwen	Joint partner/Calf rearer	Mixed (including beef suckler and specialist dairy calf to beef rearing enterprise)	Owned	120	Continuous and bought in	Pneumonia

consciousness which emphasises easier, one-dimensional explanations that reflect social expectations (e.g. cost as reflective of business acumen). This process is particularly valuable for capturing the 'hard to articulate' or often unspoken dimensions of animal management, such as its embodied, material and visceral dimensions.

In practice, the BNIM relies on two key questions. The first, known as the Single Question for Inducing Narrative (SQIN) provided the opportunity for the research participant to talk at length and uninterrupted about their experiences of calf rearing. Secondly, the narrative is developed using questions known as Particular Incident Narratives

(PINs). Importantly, the SQUIN can be framed in ways to capture the multiple influences upon decision making by situating specific research interests within the broader farming context. For the purposes of this research, the SQUIN was generally framed around calf rearers' careers as such:

"I'd like you to think back to when you first started caring for calves and describe to us your role as a calf rearer and the most significant challenges and changes you have faced during that time. We'd like you to try to describe in as much detail as possible **your story** of caring for calves. We won't interrupt you when you do this, so please take as long as you can. You can start your story as far back as you like – from the first time you were involved in caring for calves. When you do this, please tell me about what you consider to be the most significant challenges you have faced when caring for calves, and the most significant changes you have made to the way you care for them. The challenges and changes can relate to anything – it is what you feel is important that matters. They could relate to the farm as a whole, animal health challenges or specific calf rearing practices. Take a moment to think about this, and then I'd like to talk in as much detail and for as long as you can. I will not interrupt you when you are speaking but will listen and take notes. When you have finished, I will ask you some questions about what you have said."

As there are no publicly available lists of calf rearers, research participants were initially identified with help from agricultural and veterinary experts working in the field of calf rearing. Additional calf rearers were recruited using snowball sampling and social media (e.g. Twitter). A total of 25 interviews with calf rearers were conducted. Due to Covid-19, all interviews were conducted on-line over Zoom with up to two members of the research team present (GE and KO'M). Videos were enabled during the Zoom interview where possible, and follow-up visits to three farms were conducted following the lifting of Covid-19 restrictions. All participants were provided with information on the research project (via email and/or telephone) prior to interview as part of the informed consent process. Ethical approval was provided by the social research ethics committee at [Cardiff University]. All but one interviewee was female, and one interview was conducted with a female calf rearer and her husband. All interviews were recorded, fully transcribed and pseudonyms applied to participants. Analysis was undertaken in two phases. Firstly, thematic codes were generated from the interview data and coded within NVivo that related to participants' calf rearing careers, their experiences of calf-rearing and farming, and their practices of disease management and animal health care. Secondly, based on the thematic codes, an initial set of narratives were developed to describe distinct patterns of calf rearing careers and experiences. The research team reviewed and discussed the initial set of narratives, agreeing on a final set of four narratives which were recorded in NVivo.

5. Narratives of gendered calf rearing

Analysis of the interviews revealed four common narratives relating to gender, calf rearing animal health and disease management. Using quotes from calf rearers to provide context, this section considers each narrative in turn before considering in more detail what they say about disease management and gender restructuring.

5.1. Narrative 1 - natural born carers

Many female calf rearers' first encounter calves and practices of rearing growing up on family farms. In these experiences, calves are described as naturally affective, leading to the forging of emotional ties between young rearers and calves. Thus, Carol described the inevitability of care when faced with a calf which becomes her 'best friend':

"I never wanted to do anything else ... My father always said, as soon as I could carry buckets ... I was actually keeping the calves to myself ... I did lambing when I was relief milking in-between times. But, you

know, lambs don't do it like calves do it. So it's just, I don't know, what is there not to love about them?..Well, we had ... an Angus calf brought in ... it was one of those animals that I made too much of a fuss of ... She was very much my big sister, my best mate, and I suppose, you know, she didn't mix with other cows very easily ... I had her 'til she was 19 years old, I think."

The natural born carer narrative carefully balances what we might call 'caring by kin' – which emphasises the role of other female farmers in developing calf rearing skills – with 'caring by choice' as a natural and inevitable pathway for women born into farming families. Thus, Lucy describes how calf rearing was not a forced choice, using humour to explain her continued attachment to calves:

"The thing is when I was young Dad never made us do anything on the farm. If we wanted to help, we'd help but we were never made to do anything ... We'd have pet lambs that we would feed until they were so fat that could hardly walk, and yeah, we'd feed calves. [But] we were never made to do anything ... He didn't want to be that farmer who was, 'right well, you're born into a farm, so this is what you do now', you know? So, yeah, I suppose that's why I'm daft enough to still be doing it!"

At the same time, involvement in the day-to-day practices of calf rearing from an early age meant that calf care was described as an innate skill as much as one that is learned through early socialisation. Tanya, for instance, describes how calf rearing was 'bred into' her through her participation in farming routines that were led by her mother:

"My Mum would always come home from market with the poorer types of calves ... that's where my passion for calf rearing has come from. So, I think by the time I got to 17, I wanted to do it myself ... I wanted to stand on my own two feet ... it's always been bred into me, you know, calf rearing ... In the holidays, I used to go to market with her and she'd buy calves. And if I had pocket money, I was allowed to buy my own ... And then once that animal was reared and it was sold then, you know, obviously that was my pocket money to put back into it"

Similarly, Amber's calf rearing career which although based in her self-professed love of calves, was facilitated by a female farm manager who invested time in both the on-farm calves and Amber herself, over several years. Amber not only learnt about calf rearing but dairy farming more broadly but when she was offered a position as assistant herds-woman, she decided her primary interest was looking after calves:

"I could [still] do calves every other weekend because she knew that was where my heart was at ... I still had my foot in the door with the calves and obviously still did my bit. I enjoyed [the herds-woman position] but the whole time I was like 'my heart's in calves' ... We had a review and I said 'you know where my heart's at?', and she was like 'it's in calves', and I said, 'yeah' ... So, she said 'did I want to go back on calves and be full time', so I said 'yeah' ... I've never looked back ... it's nice because I see the calves that I've calved and, like, all the babies that I had, I see they're now milking, so, it's nice because I can relate to them now and I'm like oh, she was a really naughty calf or she had a few problems as a baby."

For Carol, her attachment to calves and their care has led her through a variety of full and part-time calf rearing situations-on her father's farms, other farms, her husband's farm when she got married and had children, and for the last 10 years ago on specialist calf rearing units. Moreover, though Carol talked proudly about her guidance and training of younger calf rearers who have since gone on to have successful jobs managing calf units elsewhere, Carol herself feels she has never had the

opportunity to take on such responsibility, something which appears increasingly unlikely the older she gets:

“I never got to *that* place. I’m in my old age now. I don’t want to be cake¹ carrying [but] I don’t see myself leaving calves or cows or cattle in any way until I’m buried ... My three children did say quite often if a cow was calving, you know, the calf came first not [them].”

The apparent naturalness of a mother’s care for her child and translation to caring for calves was a common theme in explanations of why so many calf rearers are female. Yet the lived experience of the ‘natural born carer’ also points to something other than the natural and innate skills that others imagine. Rather, the narrative also reveals how naturalness marginalises and constrains calf rearing careers. For instance, though Carol is proud of the knowledge she has accumulated over the years and her desire to rear calves remains, she explains the labour of rearing gets more challenging over time:

“I seem to find that it’s constant manual work, no matter what farm I’ve been on ... it is a lot of donkey work² ... I wouldn’t do anything else, even though it’s hard work and my knees are starting to creak, but ... I’ve always done manual work.”

Whilst it appears relatively straightforward for people who want to work with calves to do so - whether on family farms or elsewhere - it appears the marginal status of calves and rearers mean prospects might be limited. For example, without existing capital, it is a struggle for calf rearers like Tanya who want to establish, improve or expand their business to invest in housing or purchase property. Alternatively, others like Carol might rear calves throughout their life but encounter blockages which prevent them from gaining independence or establish a position of responsibility and take control of business decisions.

‘Natural born carers’ can therefore reveal ambivalence towards the gender identities they describe. On the one hand, the use of the narrative describes and performs gender roles (Shortall et al., 2020) that accept hard physical work, such as in Carol’s claim that she ‘wouldn’t do anything else’. Similarly, natural born carers simultaneously stress their maternal and affective bonds as part of their rearing practices by referring to calves as ‘babies’ and naming them, but also revealing that they ‘know they shouldn’t do it’. At the same time, natural born caring narratives challenge the ‘naturalness’ of calf rearing by describing how rearing practices are learnt, evolve and shared just like any other agricultural practice. Common to all the natural born carer narrative, however, is a sense of reward from working with calves.

5.2. Narrative 2 - rescuing the farm

The narrative of rescue highlights the important role that women play in keeping a farm working, but which also confines them to gender specific roles such as calf rearing. The narrative of rescue therefore highlights how women are excluded from the farm and their re-entry is prescribed by gender power relations, rather than a restructuring of them. The account provided by Abbie of her calf rearing career is a prime example. Although a natural born carer in that Abbie grew up on a farm helping out with calf rearing, like many other farmers’ daughters she left the farm to study before working off the farm in agricultural employment. She stated that she had “always been a bit gutted” that she could not work and have more involvement on the family farm. This sense of disaffection is partially due to the way in which responsibilities were divided between her father and uncles in the family partnership. Recently, however, Abbie was brought back to the farm by an unexpected event involving one of her uncles:

“[He] was starting to combine up and, you know, he got pulled into the PTO.³ So, ever since, I sort of just took the calves on basically ... This [other] job, theoretically I’m not meant to start till nine ... so it’s nice to be able to do that, you know, go up every morning before work and do the calves and help my dad milk a bit and scrape up a bit.”

The reasons for returning to work on the farm reflect recurring themes: when unexpected events (such as accidents or illness) unexpectedly shift family and farm dynamics, to help out aging parents; when farms are undergoing economic hardship; or during periods of structural upheaval in the business. Whilst stepping in might sometimes feel relatively smooth, study participants often described tensions. Complex relationships between multi-generational family members require negotiation and potentially (but not always) shift the way hierarchies are enacted through the farm, the business, and the family. Whilst the acceptance of these marginal positions of calf rearing might be interpreted as ‘doing gender’, these narratives also reveal how calf rearers’ emotional labour encompasses not just youngstock, but the family and the farm as well. Thus on-farm subjectivities become gendered through a combination of love and obligation (for their families), practices of other-than-human care (to do best by the calves) and economic necessity. Lyndsey’s rescue narrative exemplifies this: a natural born carer who left the farm to go to agricultural college, returning with a postgraduate degree in farm business management but whose first task was to help with calf rearing and other basic jobs:

“I was just a dog’s body, which is perfectly acceptable. I had just come home from college. You know, there were members of staff on the farm who’d known me since I was three years old, who were still there and there was no way that I was going to come home and suddenly be the boss and, in all honesty ... you come home with a couple of degrees, but you know, nothing! I was grain carting, silage hauling, moving sheep, vaccinating erm, you know, I did a lot of the calf feeding. I did all of the calf feeding then.”

Lyndsey’s responsibilities shifted dramatically seven years ago, however, when her father became ill, and she suddenly had to take over the dairy business:

“I suppose it was at that point really, that I, I just had to step up ... it was literally ‘this is your problem, you’re gonna have to sort it out’, and I realised how little I knew and I guess it was, that was probably a key turning point for me.”

Like Abbie’s rescue narrative, Lyndsey was required to continue looking after the calves, along with her mother, and additionally manage the other aspects of the dairy business. Calf rearing, in other words, became one responsibility of many. Although such pressure was eased by her mother feeding the calves every morning, this unpaid arrangement also brought uncertainty. Lyndsey worried that her mother’s age meant that she would not be able to continue with the physical exertion of calf rearing for much longer, and that replacing her would place an unaffordable financial burden on the business.

The rescue narrative reveals a continued assumption that younger female family members are able to help out without pay, particularly at times of economic tension and on-farm change. Commonly, this help manifests through the labour of calf rearing, something that is understood as workable around other jobs or responsibilities, whether employment or their own childcare. Whereas adult animals, in contrast, might be understood as a full-time responsibility, calf rearing is stereotypically framed as something that can be negotiated around other commitments or priorities. As such, the rescue narrative positions

¹ ‘Cake’ is a commonly used term for dry feed usually processed into blocks, or ‘cakes’.

² donkey work’ is an idiomatic expression meaning ‘hard labour’.

³ A Power Take-off (PTO) provides power to machinery towed by a tractor. It is a common source of farm injuries when clothing is caught in a PTO’s rotating shaft.

women in places of limited power within their farm, and usually with limited agency to influence calf rearing practices. This may manifest in frustration, for example, with poor housing conditions for calves, and the challenges that may induce:

“At my Dad’s farm the main challenge is the housing and we haven’t got enough room and they’re in a really erm the calves are doing well for the conditions because they’re in the old hay barn ... really, like tight, you know, loads in a pen. When it rains it leaks in the roof through the roof, so then the straw gets damp ... The calves aren’t gonna be happy with lying on damp straw. You know, I can keep going and bedding them in, which have done but it still gets wet, and it’s a waste of straw as well.”

Most vividly these frustrations are revealed in disputes over the decision to kill or care for bull calves. As Abbie described, whilst happy to help her dad due to his age, she describes the situation on the farm as “rubbish” because of disagreements with her uncle about their decision to shoot bull calves, as well as the lack of repair and investment in infrastructure which reflect both a general lack of care and Abbie’s marginalised voice:

“He shoots the bull calves, so we don’t have any. That was my uncle’s doing because they haven’t always done that, but when we were shut down with TB we would do, but now we’re open with TB he still shoots them ... I brought it up the other day, I says are we going to start keeping the bull calves rather than selling them now? Nope, not enough room, so he just shut me straight. Which is a shame because we had a bull calf the other day and it was drinking on its own, straight out of the bucket, and it’s just like, what a shame, isn’t it, a nice little bull calf.”

By association, these accounts serve to highlight how calves, themselves, are also marginalised actors within broader farming cultures and systems of production.

5.3. Narrative 3 – taking (back) control

The third narrative provides an insight into the conditions in which female farmers have been able to use their own agency in to reshape a farm to fit their circumstances. As suggested, this narrative involves taking control through personal leadership, often in the face of traditional gender stereotypes. Taking control is therefore associated with a deliberate and strategic decision to begin calf rearing at a specific moment in life, whether at times of other changes, personal crossroads or to generate new lives.

Michelle’s journey into calf rearing and agriculture began in her 30s when she married her husband, James, and moved to his family farm. At this time, her business career meant she was frequently away from the farm and had little day-to-day involvement as it was managed by her parents-in-law. In contrast to those rescuing the farm, Michelle’s increasing involvement and responsibility was initiated by herself and her own relationship with the smell of animals, rather than the ‘maternal instincts’ of natural born carers:

“What I used to notice was when I came home from work, there was a smell, and it smelled really bad ... And I used to say to myself, ‘Oh, well, it’s a farm, it’s, you know, farm smell’. So, as time went on ... I used to go into the calf pens ... it was just really dirty. I used to think ‘God, this is really disgusting’. So, one weekend I was at home and in the end, I just had to admit defeat ... and I was like, ‘stuff this’ ... so I started getting a little bit involved with the calves ... There was a couple of really ill fresh born calves in the pen. And I was going “what’s up with those?” And [the herdsman] goes, “Oh, don’t worry about those. They’re gonna die. They’re not very good, they’re shitty calves, don’t worry about it, they’re ‘poor-doers’”. And I thought, it’s not acceptable, things don’t die, things shouldn’t die. And that’s when I realised I’d seriously got to get involved and take it over.”

In stepping in to take control of the calves, Michelle was not seeking to ‘rescue’ the farm but was primarily motivated by improving the condition of the calves, their status on farm and, by association, the business. As well as highlighting their value, Michelle’s increasing input also began to spark a broader transition in the farm’s management that reflected Michelle’s own managerial career. These changes brought succession planning to a head, generating tensions, partly because she was perceived as agricultural ‘outsider’. Yet in Michelle’s eyes improving calf care was part of a much-needed modernisation that was needed to secure the farm within changing agricultural economies:

“I think I was a little bit of a threat coming into the environment ... I came in with a lot of new ideas ... They never really described it as a business, it was what they did, and it was farming, and it was a way of life. Well ... farming is a business ... if you don’t treat it as a business, you don’t survive, and that’s what it’s got to be.”

Whilst Michelle’s entry into calf rearing was unplanned, marriage and the access to land and resources it provides is a common entry point (Pilgeram and Amos, 2015; Shortall et al., 2020). Taking control can also reflect strategic choices and decisions that are made when lifecycle changes trigger change and so are difficult to separate from wider affective relationships. For Helen and her husband Peter, calf rearing represents the final stage in their farming careers and a final opportunity to work for themselves rather than others. Inheriting land as they approached retirement, they took the decision to set up a calf rearing business rearing dairy calves for beef on a contractual basis with a national company. This also provided a suitable path towards retirement, as well as a business that could be set up for their children to take over. In this case, Helen was able to take control due to the new opportunities provided by the industry’s response to the health of dairy calves, the physical affordances of the calves themselves, and the long-term care of their own family:

“To make this a sort of viable unit, we had to look into, you know, doing something, doing something a lot more with it ... We put up two new farm buildings ... We felt as we’re, we’re not getting any younger, we didn’t want to go for big cattle. We had our sheep anyway, but you can more or less handle sheep. And, so, we started looking more seriously into calf rearing ... we can cope with them.”

For others, taking control is a slow progression, reflecting the marginal status of calves and the challenge of accessing land. Thus, for a natural born carer like Tanya, a calf rearing career reflects her love of calves, but also acts as a stepping-stone to purchasing her own farm. In the meantime, independently rearing calves allows her the flexibility to do things her way, buying cheaper calves that ‘need some TLC’⁴.

The taking control narrative highlights how some people become calf rearers through strategic decisions made when various social-economic and lifestyle factors align at particular moments in their lives. Calf rearing becomes an opportunity for people who are both agricultural ‘outsiders’ (or new entrants) who find themselves journeying into agriculture, or else ‘insiders’ who may see it as an appropriate labour choice for the future. In doing so, the narrative both challenges and supports traditional gendered perspectives of calf rearing. Like all other calf rearers, the narrative describes the skilled care necessary to rear calves. However, as an entrance point to farming which can be undertaken with minimal farming experience, the narrative also reveals and reinforces long-standing, gendered subjectivities about the kinds of farm labour deemed appropriate for men (physical, technical ones) and for women (non-physical, non-technical ones).

5.4. Narrative 4 – from outsider to insider

Building on the taking back control narrative, the final narrative

⁴ TLC stands for ‘tender, love and care’.

describes how calf rearing provides an opportunity for agricultural ‘outsiders’ to develop agricultural identities. In this narrative, entry into calf rearing occurs through discovery and chance: calf rearing is instead something that people may ‘slip’ into. Naomi’s account of her career provides a good example. Growing up on the edge of a city she had no experience of farm animals or managing their health, something which changed when Naomi and her partner, Dave, were travelling in New Zealand and looking for work opportunities:

“We had never done farming before. So, what I’d seen as a cow was just literally in the field and that was it. So, we put our CV online and lucky enough it was literally a toss up between fruit picking or dairy farming and a dairy farming family got in contact with us and asked if we’d come as a couple and if we’d work on the dairy farm. And I’ve always loved animals, so we, you know, went for it ... We got into Auckland and ... then the next day we were milking 900 cows. I’d never done it before. So, we were really thrown in the deep end!”

Despite this initial shock and growing discomfort at some of the practices of the farm, Naomi and Dave continued and worked on several other farms, one of which was a particularly good experience where the owners really “cared for their animals”. This inspired them to re-shape their future plans upon returning to the UK where their calf rearing careers began in response to an advert placed in a job centre. Their experiences in New Zealand helped them find employment at a farm whose approach was similar to the farm in New Zealand. Initially helped by “the farmer’s wife”, Naomi has gained more responsibility as her knowledge and expertise have developed, despite having to manage full-time calf rearing around a family. However, despite finding this fortunate opportunity, Naomi suggests her position of an ‘outsider’ still sometimes generates problems, and she is “still finding it difficult to get into the industry”.

Sam tells a similar story of finding a place within agriculture despite not growing up on a farm. Sam’s first experiences with calves came as a teenager when she was looking for a work placement and replied to an advertisement in the local newspaper. Sam’s experience of calf rearing continued through subsequent work placements and at veterinary college, although preferring small animal medicine. After graduating, she worked in mixed veterinary practices, before leaving to start and raise a family with her farmer husband, Chris. Rather than working on a family farm, Chris (as, indeed, did his father) always rented farms, managed dairies and “moved where the jobs are”. Sam’s input into the calf rearing, therefore, has been less embedded in the complexity of family farming and its labour divisions, and more a desire to use her professional knowledge to help Chris and be involved whilst having “a toddler in tow”:

“Basically, I set up some [health] protocols, I guess, for everyone, and spoke to the people that were going to be involved in the calf rearing. So, I was taking on the main role of looking after the heifers. But if there was a problem with the beef or the bull calves ... where the other buildings were, you know, obviously I’d go up as needed, but I just couldn’t be there all the time ... in terms of the day-to-day basis, me and my son would go every morning ... probably up to about a maximum four hours we were in the heifer sheds ... feeding ... cleaning ...”

Working your way into the farm is not always straightforward, though, even with a background in farming. For instance, Katie’s account of marrying into the family farm revealed a gradual increase in responsibility, undertaking paperwork practical jobs such as calf rearing. Whereas Pete [Katie’s husband] and his mum tended to rear the calves when Katie first moved to the farm, in recent years this has changed. This gradual transition has come about amidst a variety of broader organisational changes on the farm (altering breeding routines, calving blocks, feeding routines, herd and farm size) and shifting family dynamics (aging in-laws and pregnant in-laws). Though her increased presence has been mutually beneficial for various members of Pete’s

family, particularly her mother-in-law who has hitherto cared for the calves on a daily basis, negotiating this has still been “tricky” and made it important for her to not “step on toes”:

“Whether Pete’s Mum is wanting to, I say ‘pass up the reins’, I’m not sure, because she’s still really involved, but maybe pass on some of the responsibility. It means I have more involvement, and I feel like I have more of a contribution ... I’m not here to take over, but I’m here to help ... Pete’s mum can’t manage [the calf rearing] by herself ... she’s probably in her late 60s. So, it’s, you know, I don’t expect her to do it all, but it’s just that ... someone needs to be there to help ... It’s a lot of work.”

Alternatively, Leah described how the difficulties of finding farm employment because she had no farming background meant she ended up working on a farm that no-one else wanted to. Although this provided a salutary learning experience, it reinforced the marginal status of calves and calf rearers seen in other narratives:

“My mortality rate was quite high up there because there was a lack of money wanting to be spent on drugs and stuff like that. It would be, “Oh, well, it will just die then, we can’t afford drugs”, which was a little demoralising. I did get desensitised to it eventually, but it did also teach me that actually you can cure quite a bit through just general TLC, giving it a bit of water, coming back in the middle of the day and tubing it with extra water and rehydration salts, bedding it up extra so it’s not lying in scour and stuff like that. And making sure actually that I cleaned out their water buckets every single day so they weren’t re-contaminating themselves with scours. So if anything it did teach me better animal husbandry skills, but it was a bit of a harsh lesson.”

These stories further exemplify how calf rearing pathways unfold in relation to personal relationships and family farming contexts, in this case those of extended families acquired through marriage/cohabitation. These pathways show that calf rearing can emerge as an important dimension of everyday life within the complex relationship and practical configurations that make up farms. In some regards, acquiring responsibility for calf rearing fits within the broader, gendered subjectivities of agriculture and the cultural structures that perpetuate female identities as ‘farmer’s wives’ and their expected roles e.g. Katie helping with the farm’s finances and calf rearing. As part of this process, the stories highlight how female independence in agriculture shifts according to their social context and as they become subsumed by the machinations of the farm.

Importantly, although the outsider to insider narratives differ in the degrees of tension they reveal about on-farm relationships, together they show how different marginalities intersect within agriculture and gendered subjectivities are recursively shaped. Firstly, each of these stories show that calves, marginalised to differing degrees, offer participants a means through which they can find a distinct role on the farm. Due to their own mobilities and diverse journeys in reaching their husband’s farms (as opposed to their husbands who have remained largely fixed in place), Katie and Sam are all rendered, perhaps temporarily, as ‘outsiders’. Marginalised animals, seemingly, give space and provide opportunities for marginalised people to form identities within complex, pre-existing organisations. However, as these animals have tended to have either been overlooked or cared for by people with other responsibilities, such as farmers’ mothers, the gendered nature of responsibility and place, in effect, continues. And yet, acquiring such responsibility is one way in which changing practices of calf-rearing might be facilitated as new knowledges, practices and eyes can influence and alter pre-existing practices (e.g. regarding animal health, farm efficiency and economics), albeit in ways that veer from complementation to disruption.

6. Discussion

These four narratives reveal the dominant patterns of calf rearers’ careers. They should not be understood as a rigid and complete

typology: as their description shows, there are overlaps and intersections between them. However, taken together they show how calf rearers' agencies, labour roles and position are influenced by a complex assemblage of social, material, spatial and temporal factors. In this discussion, we draw attention to the key interests of the paper: reconstituting gender identities on farms, the labour of care, and the management of animal health and disease prevention.

As a set, these narratives provide further evidence that patriarchal agricultural structures continue to shape and constrain the roles and identities of farming women. The narratives reflect how female farming careers are not a 'progressive narrative' (Pilgeram and Amos, 2015) and frequently involve living and working off-farm, and returning temporarily or permanently in response to social triggers: accidents, deaths and marriages. Indeed, the narratives suggest that calf rearing careers are shaped by chance as well as established routines of family farming. Thus, whilst practices of maternal and feminine care are central to calf rearing identities, these narratives appear to reinforce dominant subjectivities regarding the types of roles women are expected to perform and the (lack of) power they have in patriarchal farming structures.

The extent to which calf rearers are able to strategically deploy gendered caring identities to begin or further their own careers as Finan (2011) describes, also appears to be limited. The skills which calf rearers learn and share act as points of distinction between 'good rearing' identities and 'bad farmers'. However, it is only in one narrative – taking back control – where we clearly see female calf rearers directing calf rearing. Here, we find some evidence of the kind of 'room for manoeuvre' associated with the kinds of reconstitutive feminisation suggested by Byrne et al. (2014: 130) in which women purposively initiate changes that allow them to be 'active participants in shaping and re-shaping their own lives as farmers'. However, the extent to which these actions are facilitated by male farmers – a key element of reconstitutive feminisation according to Byrne et al. – is debateable. Whilst the narratives show how calf rearing careers can be supported by male partners and farmers, it is also the result of labour 'substitution' (Barberis, 1972; Inhetveen and Schmitt, 2004) because many male farmers have low levels of interest in calf rearing, or there is an engrained on-farm belief that women are better at it than men.

In this sense, the narratives presented in this paper do little to challenge existing gender relations. This demonstrates that calf rearers often suffer from the precarity of an encultured reliance on structures around them of which they have little decision-making influence. This is particularly relevant to the management of animal health and disease in calves, pointing towards a disjuncture between farmers and calf rearers and the potential for conflicting practices of calf care. This may lead to the exclusion or discounting of calf rearers' expertise in decisions about animal health and management and a failure to understand why some practices fail to work, leaving farmers to exercise their own judgment of appropriate use of medicines based on their assessment of their farms' uniqueness (Rees et al., 2021).

The introduction described how, in the dairy sector as a whole, practices of disease management reorganise agricultural space through the separation of cows and calves to prevent the spread of disease and the need to manage risks associated with bTB. Response to disease risk or outbreak could in theory act as a triggering event to change gender role on farm but there was little evidence that calf rearing had changed following disease-related restructuring of dairy farming and the demand for new modes of calf rearing. References to animal disease and health concerns were not always central to the accounts of calf rearing. In this sense changes in the management of animal health may provide a kind of background noise rather than explicit trigger of change, reflecting how restructuring affects different farms in different ways. This research therefore highlights the need for policy makers and farm advisors to be aware of the gendered dimensions of calf rearing and their implications for animal health and disease management campaigns.

Interestingly, the calf rearing narratives described here display evidence of 'doing gender' in much the same way as Shortall et al. (2020)

and Pilgeram (2007) have described. That is, calf rearing narratives perform and reinforce existing gender roles, evidenced in calf rearers' acceptance of their situation using various discursive strategies such as humour (cf. Eriksen, 2019). Other farming women – mothers and colleagues – play important roles in perpetuating these established farming narratives, in this case through their involvement in the processes of socialisation, their position and power within the farming family, and by training their daughters in the practice of calf care (cf. Riley, 2009b). Whilst this may be seen to reinforce the significance of patriarchal structures in agriculture, Riley (2009a: 674) has argued that this perspective diminishes women's 'own agency and as shapers of their own life'. Thus, whilst accepting the existence of 'patriarchal legacies', Riley (2009a: 671) suggests that there is a 'degree of "acceptability" of these identities varying in relation to temporal context'. Farming women therefore reframe domination as 'togetherness and teamwork', allowing them to hold together two important dimensions to identity: that of the family farm and its continuation, and individual identity.

There are similarities here with the narrative of rescue. Whilst rescue occurs on the terms of male farmers as a means to ensure their continued connection to their identity as a farmer, returning to look after calves may be a temporary identity to 'keep things ticking over' for the 'greater good' (Riley, 2009a: 671), whilst (and most importantly) also demonstrating an attachment and commitment to family and home. Indeed, it is perhaps not surprising that the call to rescue is not resisted for it would invoke the dangers of challenging gender norms, such as losing one's home and family (Butler, 2004). Thus, understandings of the labour of care within calf rearing and farming require us to go beyond simply thinking about the animal and the practices required to prevent disease. Rather, in caring for calves, the gendered construction of calf rearers means they are simultaneously caring for the people and place of the farm. In this sense, calf rearing identities are reflective of gendered survival strategies for family farming seen in relation to climate change by Alston et al. (2017) which enact and maintain traditional agricultural ways of living.

At the same time, calf rearing narratives articulate the kinds of frustrations Pilgeram (2007) describes female farmers experience in having to continually perform or accept gendered farming roles. On the one hand, calf rearing narratives attempt to balance discourses of hegemonic masculinity that align calf care and gender with those that describe calf rearing as a learned skill. This is most evident in the 'natural born carers' and 'rescue' narratives in which calf rearers recognise, and reproduce, essentialist connections between care and gender because it provides them with a distinctive place on the farm. This shows how whilst care is often portrayed as a 'sentiment', 'kindness' or 'fixed attribute' (Krzywoszynska, 2016), it remains patterned through wider relations, networks and contexts (Law, 2010) that can be seen as reinforcing the 'doing [of] gender'. On the other hand, calf rearers also seek to articulate their occupational identity as something which is learned and recognised through skill, without which there can be no recognition of the 'good rearer' as there is with the 'good farmer'. As Pilgeram (2007) finds, performances of gender can change to suit the audience: female farmers are adept at transgressing gender norms when the audience (itself gendered) requires. In other words, whilst describing calf rearing as a natural act of maternal care may be acceptable in some contexts, calf rearers can occupy other kinds of gender roles associated with farming when the context demands. Indeed, the ability to perform different gender roles in the taking back control narrative appears to have specific relevance to the management of animal health and disease where managerial and technological practices are more consistent with masculine practices of domination, but which are nevertheless rooted in affectual relations and desires to care for calves. Thus, in seeking to understand calf rearing, gender restructuring and disease management it may be that our attention is directed to the way that different material, technological and non-human relational assemblages configure possibilities of care that precipitate change, rather than seeking to identify specific triggers for change.

7. Conclusion

The effects of endemic cattle disease and concerns about the health and welfare of new born calves has focussed attention on the practices of calf care within livestock farming (Bolton and von Keyserlingk, 2021). This agricultural context shines a light on neglected forms of agricultural labour and potentially provides an opportunity for the reconstitution of traditional farming gender. In examining these processes, this paper provides new insights into biosecurity, gender and agricultural labour that have hitherto been left unexplored. In doing so, this paper has shown how calf rearing appears to be a practice where different farming marginalities intersect, primarily, as historically marginalised human actors (women) acquire the responsibility for animals who themselves are often a marginalised presence in farming systems (calves). Whilst this research shows that female farm workers play an integral role in calf rearing, their roles and practices are structured within traditional patriarchal relations with limited evidence of the reconstitution of gender identity. The paper therefore suggests that awareness of these gendered dimensions to calf rearing and animal health is vital for policy makers seeking to improve the health of livestock.

Author statement

Gareth Enticott: conceptualisation; Funding acquisition; Formal analysis; Investigation; Methodology; Project administration; Supervision; Roles/Writing - original draft; Writing – review & editing. **Orla Shortall:** conceptualisation; Funding acquisition; Formal analysis; Roles/Writing - original draft; Writing – review & editing. **Lee-Ann Sutherland:** Funding acquisition; Formal analysis; Project administration; Supervision; Roles/Writing - original draft; Writing – review & editing. **Kieran O'Mahony:** Formal analysis; Investigation; Methodology; Data curation; Roles/Writing - original draft; Writing – review & editing.

Data availability

The data that has been used is confidential.

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