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Towards better-informed consent: Research with livestock-keepers and informal traders in East Africa

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ABSTRACT

With the rise of the One Health paradigm, ethicists have called for new research approaches, considering the interdependent relationships of humans, animals, and their environment. These relationships can be particularly complex within resource-poor, smallholder livestock systems, necessitating a rigorous informed-consent process. Little has been published on informed consent beyond human-subject research. This paper outlines two studies on informed consent, for research identifying diseases of animal and human importance, within smallholder livestock value chains.

Firstly, a randomized independent-group study compared three communication tools (written, cartoons, and photographs) for informing 22 Tanzanian livestock-keepers before seeking their consent. A significant difference in comprehension and engagement in the informed-consent process was found between tools, and cartoons had the highest (i.e. best combined comprehension and engagement) scores. Most (21 out of 22) farmers answered half or more the questions correctly, but none were able to answer all questions. Comprehension testing allowed identification of common misunderstandings, such as immediate benefits the farmers would receive and the process to be used for relaying research results. Dialogue stimulated by cartoons and photographs allowed researchers to determine and respond to participants' varied relationships with their livestock.

The second study assessed preferred methods for indicating consent among informal-sector milk vendors in Nairobi, Kenya. Of consenting participants, 61% (140/230) indicated consent verbally, 39% (90/230) signed consent and none chose thumbprint. There was a significant enumerator-effect on both overall consent and the methods chosen.

Several of these findings echo those published in human-medical research. Additionally, highlighted here is the importance of facilitating dialogue during the informed-consent process in One Health research, for a more nuanced understanding of relationships between humans, animals, and their environment. Also discussed is how a requirement to sign consent forms might limit consent among workers in informal markets, which are commonly studied in One Health research. We suggest expansion of these, and development of further, studies towards improving consent processes in One Health research.

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1. Introduction

An estimated 600 million smallholder livestock-keepers, many of them women (McDermott et al., 2010), live in resource-poor countries; globally, livestock chains employ around 1.3 billion people (Thornton, 2010). Historically, livestock-development initiatives focused on increasing the productivity of smallholder farmers and, more recently, on improving the performance of agri-food value chains. However, the recognition that the health and wellbeing of livestock, humans, and the environment are inextricably linked has led to calls for a new One Health approach to livestock research. With the rise of the One Health paradigm, there is growing emphasis on the need for broader ethical frameworks in research (Goldberg and Patz, 2015), which respond to the moral complexity introduced from considering human relationships with animals and their environments (Rock and Degeling, 2015).

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Smallholder livestock-keepers place great economic, cultural, spiritual, and companionship importance on their animals. Accordingly, ethical clearances for research involving livestock need to not only address animal welfare (Seth and Saguti, 2013) but also the concerns and interests of livestock-keepers. A One Health ethic would demand that in livestock research, the universal ethical principle of Respect for Persons (U.S., 1978) be fostered through a robust informed-consent process (ICP), treating livestock-keepers as autonomous agents. Additionally, care should be taken when conducting research within livestock value chains in resource-poor countries. Characterised by informal, small-scale businesses, these production systems and associated animal-source foods are well-known contributors to outbreaks of zoonotic disease and therefore, are intensively studied in One Health research. Workers in these businesses are often heavily dependent on the income they generate. This dependency, coupled with the fact that practices may be of questionable legality or advisability, means potential risk to research participant livelihoods may be significant. Thus, in this research context also, care must be taken to ensure a rigorous ICP.

Informed consent has received much attention in human-health research, especially in the challenging context of cross-cultural research (Dawson and Kass, 2005; Marshall, 2007; Durham, 2014). The Declaration of Helsinki (W.M.A., 2013) set standards for the process of informed consent and urges researchers to pay special attention to the methods used to convey information to prospective participants. It is essential to ensure information presented is understood. Various researchers have evaluated, with the use of questions and quizzes, the degree of comprehension derived from different types of information-giving processes. Bhansali et al. (2009) and Fitzgerald et al. (2002) found that participants exposed to the same information exhibited a wide range of comprehension levels. Penn and Evans (2010) found that not just the content but also the *process* used for giving information was influential and could be modified to improve comprehension test results.

Relatively little has been published on the design of ICPs outside research on human subjects. The authors, with many years' cumulative experience of livestock research in low-income countries, have observed that study participants in those settings do not always comprehend all information provided in written consent forms and are not always comfortable with providing signatures on consent forms. Moreover, the fact that consent to participate in research is seldom refused by rural participants also raises questions about the validity of the consent process.

This paper aims to contribute to the literature around ICPs in cross-cultural, One Health research. Two case studies are presented, on seeking consent for research from livestock-keepers and agri-food workers in resource-poor communities. The first study compared three communication tools used to provide project information prior to seeking consent, comparing comprehension and engagement among rural livestock-keepers in Tanzania. The second study assessed which type of consent (verbal, signed, or finger-print) was preferred by small-scale, informal-sector milk vendors in Nairobi, the capital of Kenya.

2. Methods

2.1. Testing communication tools, for improved informed consent: Tanzania, cattle owners

This study took place in a pastoralist community in Morogoro Region, Tanzania, as part of the pilot phase of a large field survey of cattle diseases. Twenty-two adult cattle owners, including 21 males and one female (in place of her absent husband), were recruited by a local extension officer to partake in the pilot. The number was limited by both the size of the community and time constraints associated with the pilot activities. All 22 of these farmers were invited to participate in the informed-consent study. The recruitment process involved a group information session (including time for questions and answers) before consent was sought. In this way, all participants received the same description of this study before it commenced.

Four enumerators (one female and three males) fluent in the national language (Kiswahili), were trained to take participants through a mock ICP, using one of three alternative communication tools. The enumerators were trained to provide the same project information irrespective of which communication tool they used. This included information on field activities, which would involve administering a questionnaire and sampling blood and milk from cattle. In addition, the process was designed to include all elements of informed consent as per the Declaration of Helsinki (W.M.A., 2013).

The three different tools and associated ICPs were:

A. Written: A written document in the national language (Kiswahili). A copy was given to the participant and another was used as a script, read out by the enumerator.

Photographic: A poster with 6 photographs on the front (Fig. 1), which visually represented the different elements contained in the written document. The reverse of the poster contained bullet points used as prompts by the enumerator, to cover all of the necessary information. The participant listened to the enumerator's explanation of the project, whilst freely looking at the images.

B. Cartoon: A poster with 6 cartoons conveying the same information as the photographs (Fig. 1). The prompts and process were the same as for the photographic tool.

The tools for the ICP were chosen according to their relevance and practicality in the context where they were to be used. The written tool was chosen because this is a very commonly-used style of communication and documentation in ICPs. Given the remote nature of the field work, communication tools requiring electricity had to be avoided (e.g. video or voice recordings). Posters were practical, easily transported, durable, and allowed prompts to be written on the back to minimize the risk of enumerators omitting information. A media and design consultant was recruited, working with the research team to convey research methods through cartoons, and design the posters.

Three mock ICP stations were set up and enumerators took it in turns to conduct the mock ICP. The remaining enumerator in each round filled the role of silent observer, along with one additional male and female researcher. Thus, each station had one enumerator and one silent observer for each round. The allocation of participants to stations involved participants' sitting in a group, away from the stations. As a station became available, the group nominated the next participant to move to it. The enumerators alternated between the three communication tools and each participant was exposed to only one tool.

Levels of comprehension of project information and engagement in the ICP were measured. The silent observer recorded the time from the start of the ICP until the participant gave consent, including any time for questions the participant had. The observer also made notes on the content of the questions. Throughout the process, the observer also made qualitative observations related to engagement (such as the degree of eye-contact they perceived) between enumerator and participant. As part of the process, each participant was provided with a contact card, so that they could contact the research team if any concerns or questions arose during or after the research activities.

On completion of the consent process, each participant completed a quiz designed to capture their level of comprehension of the information presented (Appendix A). The quiz included eight open questions: five factual questions on different aspects of the sampling activities; two questions on the benefits of participat-

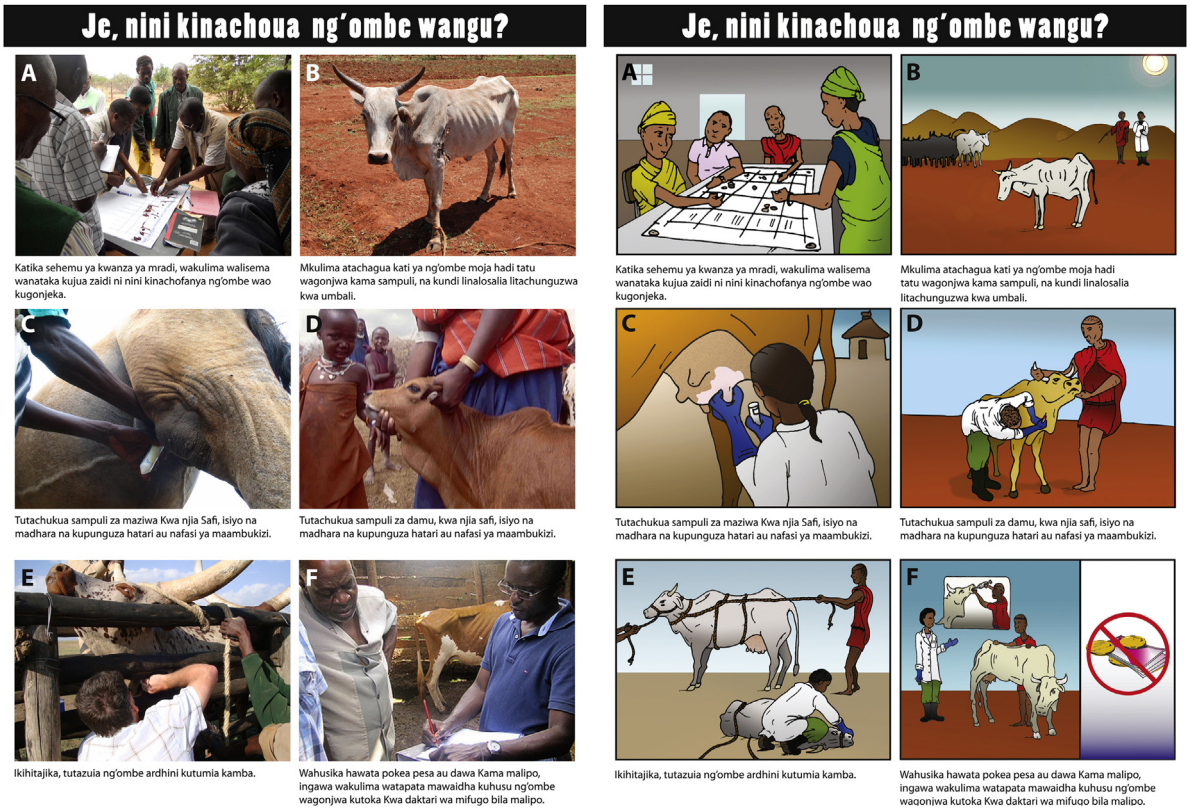

Fig. 1. Front of posters used in the informed-consent process. Photographs were limited to stock images available under Creative Commons License. Figures and captions (in Kiswahili) aimed to represent the same information. The English translation of the captions is as follows. **Box A:** In the first part of the project, farmers said they want to know more about what is making their cattle sick. **Box B:** Farmer will choose 1–3 sick animals for sampling and the rest of the herd will only be examined at a distance. **Box C:** We will take milk samples in a clean, safe manner, to minimize risk. **Box D:** We will take blood samples in a clean, safe manner, to minimize risk. **Box E:** If necessary, we will restrain cattle on the ground using ropes. **Box F:** Participants will not receive any money or medicine for participating. However, farmers will receive advice about sick animals from a veterinarian, without having to pay.

ing in the survey and one question on how the farmer would find out about the results of the survey. Finally, the farmers were asked whether or not they would hypothetically consent to the survey described and if they would have any concerns about the study.

Upon completion of the field work, a focus-group discussion was held with the four enumerators, to collect their views and summarise their experiences with the different ICPs. This session was semi-structured, encouraging discussion. Enumerators presented opinions and debated ideas on the positives and negatives of each tool, both with respect to operator (their own) use and response from participants. Initially each ICP was discussed in sequence and then they were compared. Finally, enumerators were asked for suggestions on how the consent process could be optimised further.

2.2. Preferred method for specifying informed consent: Kenya

In a study to assess contamination of milk in Nairobi, Kenya, all milk retailers in a low-income area were targeted to be interviewed. This included all milk-selling ventures that could be identified within the area, such as milk bars, street vendors, supermarkets, kiosks, and other milk traders. Three different methods of indicating consent were offered to all the identified milk retailers that were willing to participate: written, fingerprint, or verbal. The respondents were allocated in turns to one of three local enumerators (two male and one female enumerator) who were trained on appropriate communication processes for informed consent. After presentation and explanation of the study, enumerators asked respondents about their willingness to participate in the study; if the answer was positive, the respondents were asked to indicate consent using their preferred method: by signature, by fingerprint, or verbal. For signed consent, the respondent filled in the blanks for name and signature on the consent sheet; for fingerprint consent, the respondent placed their inked fingerprint in the designated space on the consent sheet; and for verbal consent the enumerators noted consent on the consent sheet.

The questionnaire was structured to obtain basic demographic information about the participant, information about business practices, hygiene awareness, and family members' milk consumption. This demographic information was recorded against the method of consent chosen, to later explore factors that may explain preferred method of documenting consent.

2.3. Data analysis

For the communication tool (written, photographic, cartoon) assessment, a *comprehension score* (i.e. quiz score) was calculated for each participant, based on their responses against the content of the written consent form. The written consent form was used as the standard for grading the comprehension quiz because this was a written version of the information conveyed through all three ICPs. There were a maximum of 12 marks to be obtained (one mark for each accurate piece of information) across 8 questions. The sum of the marks produced the comprehension score (maximum score was 12). A half mark was deducted for each erroneous answer, which contained information not in the consent form. The overall score for each question was also calculated as a percentage of 22 total marks, to identify areas of common understanding and misunderstanding.

In addition, an *engagement score* was constructed for each participant, by summing the comprehension score, the time spent on the ICP, and the number of questions asked. Weighting was not applied, as the study was equally interested in the three components constituting the engagement score. A Kruskal Wallis test was conducted to assess differences in engagement score between groups. We made three comparisons (written with photographic; written with cartoon; photographic with cartoon) and hence adjusted the cut off *p*-value to 0.0167 (that is 0.05 divided by three) to account for multiple comparisons.

For the consent-method (signed, verbal, fingerprint) assessment, incomplete forms where consent was not noted correctly were removed from the database and comparisons made between the proportions of participants who preferred each of the methods. Because no respondents chose the fingerprint method, preferred consent method was a binary variable with either signature or verbal consent. The evaluated attribute variables were: respondents' age, sex, occupational role (employee or shop owner, which included family members of the shop owner), and enumerator who administered the consent process. Univariable associations between the respondents' attributes and their preference on consent method were analysed using chi-square test or Fisher's exact test for categorical data and *t*-test for continuous data, using an uncorrected alpha of 0.05. All comparisons were 2-sided. The variables that were associated with $p < 0.2$ with the method of consent were included in a mixed-effects logistic model (xtmelogit, using Wald statistics for *p*-values), with enumerator as a random effect to account for clustering, after co-linearity had been excluded between them using univariable analysis as above. In the multivariable model independent variables were retained if $p < 0.05$ or if the variable had a substantial influence on another variable that remained as a predictor in the model; no variable was forced into the model. All analyses were performed using Stata v.14 (Statcorp, Texas, USA).

3. Results

3.1. Testing communication tools, for improved informed consent: Tanzania, cattle owners

3.1.1. Tool assessment

All farmers invited to participate in this study agreed to take part (22/22). The median participant score on the comprehension quiz was 7.3 (range 5–11) out of a maximum of 12. Only 7 of the 22 farmers were able to give correct answers for more than two thirds of the questions, while 7 farmers answered half or less than half of the questions correctly. Formal comparisons were only made for the overall engagement scores. Knowledge (quiz score) contributed around 43% of the engagement score and involvement with the process (proxied by time spent and questions asked), 57%. There was a statistically significant difference in median engagement score between groups as determined by a non-parametric Kruskal Wallis test ($p = 0.021$). The adjusted post hoc comparisons revealed a significant difference between the group presented with cartoon format and written format ($p = 0.015$). The difference in medians between the cartoon and photograph groups ($p = 0.028$), and between the photograph and written groups ($p = 0.354$) were not significant according to the p adjusted for multiple comparisons ($p < 0.0167$) (Table 1).

Descriptively, participants exposed to the cartoon format had the highest comprehension scores, followed by those exposed to the photographic format, and then the written format. The same pattern was observed with regards to number of questions asked. The time spent on the consent procedure (which included time for questions) was more than two minutes longer for the cartoon format compared to the other two formats.

The accuracy of the responses varied between questions. Descriptively, it was highest for the question on who would select the animals for sampling (91% correct), while fewer participants provided correct answers to the questions around benefits (50%). The most common misunderstanding was on immediate benefits; most farmers answered that no benefits would be received, while in fact, the consent form stated farmers would receive advice regarding any diseases their cattle visibly displayed that day. Nearly one third of respondents thought that the contact number of the project principal investigator (which was given as part of the ICP) had a role in giving information on the survey results to the farmers, although the consent form stated that information would be conveyed in the medium which most farmers preferred. For this question, a female respondent replied '*I don't know because I am a woman; maybe for the men to know*.' When participants were asked who would collect biological samples (the information presented explained both blood and milk would be collected by members of the research team), many thought men would collect blood and women, milk.

All participants said they would consent to the study if requested. Only five participants expressed a concern with the presented study and this was most commonly related to worries that they might not receive feedback. One farmer exposed to the written form explained that he '*would not be able to participate if anything new was added after the informed-consent process*.'

3.1.2. Focus-group discussion: enumerators' impressions

Upon semi-structured discussion, the four enumerators agreed the written form was least preferred, as it was perceived to take a longer time to administer (compared to the posters) and because it was difficult to make eye contact with the participant while reading it. Enumerators reported that participants were bored or 'less engaged' throughout the ICP when they used the written form. On the contrary, when using posters, enumerators enjoyed adapting their own words to suit their audience and felt they could make their point more quickly; they also enjoyed greater eye contact with participants. The posters were perceived to be more attractive and engaging and several farmers asked to keep a copy of the poster. The only positive trait of the written form enumerators mentioned was that some farmers indicated liking to have a contract-style agreement signed by themselves and researchers when consenting to take part in a research project, to keep researchers accountable.

Enumerators reported that participants more rapidly comprehended photographs than cartoons. However, one of the photographs showed a camel udder rather than a cow udder, leading to much debate. Likewise the photographic poster showed blood being collected from an animal in a crush leading one participant to ask if the research team had skills to take blood from cattle without a crush. Pictures illustrating cattle restraint often prompted participants to describe the best way to restrain their particular animals. '*Our animals are used to the colours we wear and when they see others, panic.*'—Pastoralist comment, when looking at pictures of scientists in laboratory coats, taking samples. The last cartoon box in particular, depicting the limited study benefits (a participant receiving advice rather than cash or medicine), often prompted vigorous discussion. According to enumerators, this discussion allowed opportunities and limitations of study benefits to be more comprehensively understood before consent was granted.

Enumerators perceived that cartoons more easily represented the *ideal* situation (such as a clean udder) whereas photographs more accurately represented the *real* situation. In both cases, enumerators recommended that posters have a picture to represent every key point of the informed consent (instead of 6 major ones, as was the case in this study). This way, they would not need to read

Table 1
Comparison of informed consent process measures using different communication tools. Three tools are compared, including a cartoon poster, photographic poster and written consent form. Superscripts indicate significantly different at an adjusted p of 0.017 (where superscripts are shared, there is no significant difference).

Measure	Cartoon	Photographic	Written
Number of participants	7	8	7
Median comprehension score (range)	8 (6–11)	6.3 (6–10)	7 (6–8)
Median number of questions (range)	1.0 (0–5)	1.5 (0–3)	0 (0–1)
Median time (minutes) (range)	10.3 (5–12.28)	7.2 (5.48–10.4)	7.2 (5.26–12)
Median engagement score (range)	21[a] (15–22.3)	16.5[ab] (16.9–18.5)	14.4[b] (10.3–20)

Table 2
Risk factors for signature as the method of consent among 230 milk traders in Nairobi, Kenya (odds ratios and 95% confidence intervals).

Variable	Odds ratio (95% CI)	P
Sex (male versus female)	1.57 (0.92–2.7)	0.098
Employment Position (employer versus employee)	2.7 (1.2–6.0)	0.013
Enumerator: Male 1 compared to female	0.02 (0.01–0.07)	<0.001
Enumerator: Male2 compared to female	0.01 (0.004–0.03)	<0.001

Table 3
Risk factors for signature as the method of consent among 230 milk traders in Nairobi, Kenya (odds ratios and 95% confidence intervals) Results of multivariable logistic regression model with enumerator as a fixed effect.

Variable	Odds ratio (95% CI)	P
Constant	0.09	0.112
Sex (male versus female)	2.2 (0.92–5.4)	0.077
Employment Position (employer versus employee)	1.9 (0.56–6.4)	0.305

Model Wald Chi2 p = 0.126.

the back of the poster (prompts) at all. Enumerators recognised eye contact as being the key determinant of a good ICP.

3.2. Preferred method for specifying informed consent: Kenya

A total of 350 eligible milk retailers were identified and 71% of these participated in the study. Among those 250 retailers who gave consent, 178 were owners, 48 were employees, 11 were family members, and for 13 data were not recorded. The preferred method of documenting consent was not noted for 18 retailers, and was lost for 2. The two male enumerators were responsible for one and three of the record failures, whereas the female enumerator was responsible for 16 record failures.

Of the 230 participants with information on preferred consent method, 61% (140/230) preferred verbal consent, 39% (90/230) signed consent, and 0% chose to fingerprint. The difference in proportion of participants opting for the different methods of documented consent was significant ($p < 0.001$). Of the respondents, 165 were shop owners, and an additional 10 were their family members. Another 44 stated that they were employed, and 11 did not answer that question. Age was normally distributed between 15 and 63 years, with a mean of 31.5.

Association analysis revealed a strong influence of enumerator on whether a respondent agreed to take part in the study, and on the consent method preference ($p < 0.0001$ for both). One of the enumerators (the only female) received consent from 82% (92/112) of the contacted retailers, but in 15 of those 92 cases, consent type was not noted, and in one case the consent sheet was lost. Of those participants for whom consent type was noted, 91% gave this enumerator written consent. Contrastingly, the other two enumerators received consent from 70% and 64% of the retailers they visited, with written consent given by 19% and 9% of the respondents, respectively.

The respondents' age and gender were not significantly ($p > 0.09$) associated with the consent-method preference. On the other hand, with univariable analysis, respondents' occupational role did show influence on the consent-method preference; Shop owners (including their family members) were 2.7 times (95% confidence interval 1.2-6.0) as likely as employees to choose written consent ($p = 0.013$) (Table 2). After adjustment for potential clustering by enumerator, the independent variables included in multivariable analyses (sex and occupational role) were not significant predictors of consent-method preference (Table 3).

4. Discussion

The study on communication tools for informed consent revealed that no participant fully understood the simple messages conveyed in the one-page consent form, and that only a minority of the farmers understood two thirds or more of the questions. However, the sample size was small and the method for testing comprehension might have contributed to lower scores; Lindegger et al. (2006) found that the method used to test comprehension was an important variable, because when testing the same participants, four different testing methods yielded significantly different results. The authors suggested a combination of measures be used. Notably, forced-choice measures yielded higher comprehension scores than open-ended questions such as those we used. Fitzgerald et al. (2002) found that providing three information-giving sessions compared to a single session (such as ours), could have a significant, positive effect on comprehension (increasing quiz pass-rate from 20% to 80%).

While care should be taken in interpreting results, comprehension tests have been credited with highlighting the problematic aspects of a consent form (those which most study recruits find difficult to understand), allowing improvements to the form (Shafiq and Malhotra, 2011). For example, the influence of gender norms became apparent when testing comprehension. In the rural community, men traditionally collect blood, and women, milk for human consumption. This likely influenced the common misunderstanding that men would collect blood and women would collect milk (the information presented explained both would be collected by members of the research team). Similarly, the female participant who stated she did not know how results and information resulting from the study would be provided because she was a woman, may reflect the gender norm of men interacting with outsiders to receive information about animal health. This illustrates how messages that are inconsistent with societal norms may not be easily retained even if clearly explained.

The cartoon format was associated with significantly higher engagement scores, and farmers exposed to this ICP also had better comprehension and asked more questions. This difference between tools and the confusion around two of the photographs in particular, emphasises the need for testing of communication tools

within target communities. Ajayi et al. (2009) provides a theoretical justification and evidence for using participatory processes in developing healthcare materials with end-users, which can ensure messages are simplified and clarified. An example from our study (of where a participatory process would have likely been useful) would have been to ensure researchers and end-users had a common understanding of the term 'benefit.' Most participants said they would receive no immediate benefits, despite the last box on the posters depicting, and the written form describing, the free veterinary advice participants would receive. The associated pictures had been responsible for stimulating the most dialogue during the ICP but this alone was not enough to result in a high overall score for this question. It is possible that participants had a more material understanding of the term, 'benefit.' Although the tools in the present study were not created in a participatory manner, the knowledge gained through evaluation informed their revision before they were used more widely.

The research team gained valuable information during discussion around the pictures, leading to reduced risk for participants and researchers through faster, safer sample collection and a deeper understanding of the human-animal relationship of each participant. This dialogue is particularly important in cross-cultural One Health research, because relationships between people, their animals, and environment vary significantly between cultures (Zinsstag et al., 2012). Interpersonal skills during the ICP are crucial, because dialogue can lead to either increased trust or mistrust in a research community, depending on the skill of the researcher-communicator (Molyneux et al., 2005a). Additionally, evaluation procedures around ICPs can create anxiety, necessitating a cautious approach (Molyneux et al., 2007). The potential effect of third parties was suggested in the study on consent method preference, where one enumerator, the only female, elicited higher overall consent and 91% signage. It could be hypothesised that despite the same content being explained to each potential recruit, the nature of the interaction with this enumerator was significantly different to the others. In communities at higher risk of diminished autonomy, it is particularly vital that third-party actors (enumerators) are well-trained and engaged in the process (Penn and Evans, 2010). In the study of communication tools, the focus-group discussion with enumerators revealed that they felt eye contact between themselves and participants was very important during the ICP. They enjoyed using posters, and felt they were able to better engage with participants than when they used the written form.

Individual informed consent is generally considered an application of the principle of Autonomy (Bhansali et al., 2009); however, autonomy may be limited in collective societies, where the family or community is the focus of the decision-making process (Sharif and Bugo, 2015). In our study testing communication tools, all participants indicated they would consent to the field survey presented to them. However, in practice, consent in agro-pastoralist communities is usually first provided at the community level, through a village meeting. In these collective societies, it is recommended that project information be presented and consent sought at all levels, which may include village meeting, family, household, and individual levels (Gikonyo et al., 2008). However, researchers are warned against making overly-simplistic generalisations of perceptions around informed consent, because individuals vary within communities and the mechanisms for achieving autonomy may be subtle, such as through persuasion of men by women, for example (Marshall, 2007). Studies also show perceptions and opinions on research vary over time, emphasising the need for informed consent to be seen as an ongoing process during research (Molyneux et al., 2005b; Gikonyo et al., 2008), which also allows for greater flexibility in navigating complex societies (Marshall, 2007).

The study on consent method preference found that a large proportion of participants preferred to indicate consent orally, fewer by signing, and none chose thumbprint. A publication commissioned by the World Health Organisation (Marshall, 2007) exploring ethical concerns around ICPs in resource-poor settings describes how in some cultures, signatures are reserved for marriage documents and other significant life events. Also, the publication noted that people may be concerned about signatures or thumbprints in communities where they have previously been used against citizens by authorities. In Kenya, milk producers and retailers must be licensed (Kenya, 2004). Although there is now a move by the Kenya Dairy Board to train and certify small-scale operators, as of 2011, only 4000 small-scale milk vendors had gone through this process (DFID and ILRI, 2011). When questions might involve topics of illegal or inadvisable practices, such as those surrounding milk contamination (which was studied in the parent project of the study reported in this paper), it may be anticipated that fewer people will be willing to mark a formal document. Additionally, it is hypothesised that employees may be less willing to provide a signature than employers, if they are unsure about the legality of their situation.

Presenting prospective participants with multiple consent-method options could reduce the risk of those concerned about signatures being precluded from participation. That is, diverse consent methods may foster the universal ethical principle of Justice (U.S., 1978), as well as reduce recruitment bias. The prescriptive approach of requiring written signatures or thumbprints can underscore a legalistic rather than social approach to obtaining consent. As such, it may function more to protect the interests of institutions and researchers than the study participants (Marshall, 2007). The higher proportion of signed consent attained by the female enumerator may indicate that she was able to invoke more trust among the participants. However, in the study of communication tools, some participants expressed a desire for this contract-style agreement, to bind researchers to what was agreed. This emphasises the need to understand research context, not only to allow risks to be anticipated but also to inform ICP design; characteristics of optimal ICPs have been shown to vary greatly with cultural context (Bhutta, 2004).

5. Conclusion

In the first of the case studies in this paper, a visual (poster) communication tool was used to achieve a more dynamic and interactive ICP, compared to the commonly used, written format. This tool facilitated mutual learning between participants and researchers, and dialogue provided useful information for ensuing field work. In the second case study, we found that urban, informal-sector milk vendors had varied preferences for consent method, and both thumbprint and the common standard of signature were less preferred than verbal consent. The significance of third-party actors was also highlighted. We recommend these studies be expanded and complemented by further studies into optimising ICPs in One Health research. A One Health approach to ICPs will move beyond treating animals and farms as property to be rendered to research. Rather, it will duly respect the importance of animals, and the environment in participants' lives. A thorough, dialogical ICP may also present opportunities for researchers to benefit from the greatest source of context-specific knowledge, livestock-keepers.

Ethical approval

Ethical approval was granted (approval numbers IREC2013-09, and IREC2013-17) by the institutional research ethics committee of the International Livestock Research Institute in Kenya, which is authorised by Kenya's National Council for Science and Technology (NACOSTI).

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Appendix A. : COMPREHENSION QUIZ QUESTIONS

1. How will animals be selected for sampling?
(a) Who will select the animals on each farm?
(b) What sort of animals should be selected?
2. Which samples will be taken from the farm?
3. Who will be collecting the samples from the animals?
4. How will the samples be collected?
5. What benefits would the farmer get, from agreeing to be in the study:
– On the day we take the samples?
– In the future?
6. How will the farmer find out about the results of the study?
7. If we were asking to conduct this study on your farm:
– Would you agree to participate (circle)? Yes No
– Would you have any concerns about letting us conduct the study on your farm?

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