

Supplementary File 1
Questionnaire Survey Form Regarding Antimicrobial Resistance (Milk Vendors – Zaria, Nigeria)

Note: This questionnaire was administered under ethical approval ABUCUHSR/2022/29.

This questionnaire was conducted in person among milk Vendors and small-scale dairy retailers in Zaria, Nigeria, with particular emphasis on Fulani women engaged in the informal sale of *Nono*, *Kindirmo*, and fresh milk at local markets and designated joints. Written informed consent was obtained from all participants prior to enrolment.

The instrument was designed to capture demographic information, as well as knowledge, attitudes, and practices related to antimicrobial resistance (AMR) in the context of informal dairy value chains. Participation was voluntary, responses were recorded anonymously, and all data were analysed exclusively for academic and public health research purposes.

Dear Respondent,

This questionnaire is designed to systematically assess your knowledge, attitudes, and practices regarding antimicrobial resistance (AMR) in the context of informal dairy vending. Your responses will be treated with strict confidentiality and will be used solely for academic and public health research purposes. There are no right or wrong answers; kindly respond to each item as honestly and accurately as possible. Your participation is entirely voluntary and greatly appreciated.

Section A: General Information

A1. Name of village/settlement:

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A2. Type of respondent:

- (a) Hawker
- (b) Shop-based retailer

A3. Principal species from which you obtain milk or milk products (tick all that apply):

- (a) Cattle
- (b) Goat
- (c) Sheep
- (d) Camel

A4. How many distinct sources do you currently obtain your milk from?

- (a) 1 source

- (b) 2 sources
- (c) 3 sources
- (d) More than 3 sources

A5. Have you ever participated in any structured training program, seminar, or sensitization campaign specifically addressing antimicrobial resistance?

- (a) Yes
 - (b) No
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Section B: Knowledge Regarding Antimicrobial Resistance

B1. Have you ever encountered the term "antimicrobial resistance"?

- (a) Yes
- (b) No

B2. In your understanding, which of the following best describes what antimicrobial resistance means?

- (a) It leads to complete treatment failure in animals or humans
- (b) It leads to a diminished or inadequate response to treatment
- (c) Both (a) and (b)
- (d) I do not know

B3. Is antibiotic resistance a serious public health concern?

- (a) Yes
- (b) No
- (c) Not sure

B4. Is antimicrobial resistance both a naturally occurring and a human-induced (anthropogenic) phenomenon?

- (a) Yes
- (b) No
- (c) Not sure

B5. Can the irrational or inappropriate use of antibiotics in animals contribute to the emergence of resistance in humans?

- (a) Yes
- (b) No

- (c) Not sure

B6. In your opinion, can antibiotic residues present in milk or meat contribute to the development of antimicrobial resistance?

- (a) Yes
- (b) No
- (c) Not sure

B7. Does the use of expired antibiotics result in the emergence of antimicrobial resistance?

- (a) Yes
- (b) No
- (c) Not sure

B8. Are you aware of *Acinetobacter* spp., a multi-drug-resistant organism (superbug) that has been identified in Kano State, Nigeria?

- (a) Yes
- (b) No

B9. Are you aware of Livestock-Associated Methicillin-Resistant *Staphylococcus aureus* (LA-MRSA)?

- (a) Yes
- (b) No

B10. Are you aware of the World Health Organization (WHO) list of critically important antimicrobials for human medicine?

- (a) Yes
- (b) No

B11. Are you familiar with the recommendations of Nigeria's National Antimicrobial Resistance (AMR) Action Plan?

- (a) Yes
- (b) No

B12. "In Nigeria, most milk is routinely tested before consumption to verify its microbiological safety." How would you rate this statement?

- (a) True
- (b) False
- (c) Do not know

Section C: Attitudes towards Antimicrobial Resistance

For each statement below, please indicate the response that most accurately reflects your personal opinion by ticking one option per row.

Response Scale:

SA = Strongly Agree | A = Agree | SWA = Somewhat Agree | N = Neutral | SWD = Somewhat Disagree | D = Disagree | SD = Strongly Disagree

S/No	Statement	SA	A	SWA	N	SWD	D	SD
C1	I believe that there are currently sufficient new antimicrobial agents under development to keep pace with the growing global problem of resistance.							
C2	Healthy individuals and apparently healthy animals can serve as asymptomatic carriers of antibiotic-resistant bacteria.							
C3	I am personally concerned that I or a member of my household could acquire a life-threatening infection caused by antibiotic-resistant bacteria.							
C4	Skipping one or two doses of a prescribed antibiotic course can meaningfully contribute to the emergence of antimicrobial resistance.							
C5	The use of two or more classes of antibiotics in combination is invariably superior to monotherapy for the control of bacterial infections.							
C6	Broad-spectrum antibiotics are always a preferable option over narrow-spectrum agents, even when the latter are available and appropriate.							

C7	Critically important priority antibiotics should be reserved exclusively for human therapeutic use.							
C8	Upon visiting a dairy farm, there is a substantial likelihood of being exposed to antibiotic-resistant bacteria.							
C9	Upon visiting a hospital or other health facility, there is a substantial likelihood of being exposed to antibiotic-resistant bacteria.							
C10	Systematic testing of milk before sale is important to protect consumers from health risks posed by antibiotic-resistant bacteria.							
C11	I always advise farmers to refrain from selling or using milk during antimicrobial treatment and throughout the recommended withdrawal period, as failure to do so poses a risk to consumers.							

Key: SA = Strongly Agree, A = Agree, SWA = Somewhat Agree, N = Neutral, SWD = Somewhat Disagree, D = Disagree, SD = Strongly Disagree

Section D: Practices Relevant to Antimicrobial Resistance

D1. How frequently do you visit livestock farms other than your own, whether for commercial or social purposes?

- (a) Never
- (b) Occasionally (a few times per year)
- (c) Approximately once a month
- (d) Approximately once a week
- (e) Almost every day

D2. How frequently do you visit a hospital, clinic or other health facility for any reason?

- (a) Never
- (b) Occasionally (a few times per year)
- (c) Approximately once a month
- (d) Approximately once a week
- (e) Almost every day

D3. Have you ever received formal advice or professional counselling from a health or veterinary professional specifically regarding antimicrobial resistance?

- (a) Yes
- (b) No

D4. If yes, from which category of professional did you receive this guidance? (tick all that apply)

- (a) Medical doctor
- (b) Nurse or midwife
- (c) Veterinarian
- (d) Pharmacist
- (e) Other (please specify):

D5. Have you participated in any training sessions, conferences or continuing education activities aimed at keeping your knowledge of antimicrobial resistance up to date?

- (a) Yes
- (b) No

D6. Have concerns about antimicrobial resistance led you to modify your approach to antibiotic use, whether in animals or within your own household?

- (a) Yes
- (b) No

D7. If yes, which of the following changes have you implemented? (tick all that apply)

- (a) I now consistently complete the full prescribed antibiotic course
- (b) I avoid using antibiotics without a valid prescription or professional recommendation
- (c) I avoid sharing unused or leftover antibiotics with other individuals or animals
- (d) I have reduced or entirely discontinued the routine, non-therapeutic use of antibiotics in animals
- (e) Other changes (please specify):

D8. What is your usual first-line response when an animal presents with pyrexia of unknown origin (PUO) or an undifferentiated febrile illness?

- (a) Administer antipyretics alone
- (b) Initiate over-the-counter antibiotic treatment without professional consultation
- (c) Administer a combination of antipyretics and antibiotics
- (d) Seek consultation from a veterinarian or other qualified professional

D9. Would you routinely advise fellow farmers to withhold milk from sale during antimicrobial treatment and for the full duration of the recommended post-treatment withdrawal period?

- (a) Yes, always
- (b) Sometimes, depending on circumstances
- (c) No, never

D10. Do you adhere to the recommendations of Nigeria's National Antimicrobial Resistance (AMR) Action Plan in your daily professional practice?

- (a) Always
- (b) Sometimes
- (c) Never
- (d) I was not aware of this Action Plan prior to this survey

D11. Can non-human animals (e.g., dogs, cats, rodents, poultry or livestock) readily access the storeroom or area where milk or milk products are held?

- (a) Yes
- (b) No
- (c) There is no designated storeroom

Thank you sincerely for your time and cooperation. Your contribution to this research will help inform evidence-based public health interventions aimed at combating antimicrobial resistance in informal dairy supply chains in Nigeria.

Interviewer's Name:

Date of Interview:

Interviewer's Signature:
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