(A)participant demographic and academic characteristics:

A1. County

○Benin
○Sudan
○Malawi
○Botswana
○Cameroon
○Nigeria
○Namibia

A2. University (after branching)

….

A3. Academic discipline

○Medicine
○other

A4. Academic year/ level

○Year 1
○Year 2
○Year 3
○Year 4
○Year 5
○Year 6
○Other

A5. Age group

○<20

○20–24
○25–28
○≥29

A6. Have you started clinical training/clinical placement?
○Yes
○No
○Not applicable to my program

(B)previous educational exposure to AMR, antimicrobial stewardship, and One Health education and training

B1. Have you previously received any education or training on the following:

First,antimicrobial resistance (AMR)?
○Yes
○No
○Not sure
Second, one health?
○Yes
○No
○Not sure
Third, antimicrobial stewardship (AMS)?
○Yes
○No
○Not sure
Fourth, infection prevention and control (IPC)?

○Yes
○No
○Not sure
B2. Have you participated in an AMR/One Health workshop, course or seminar?
○Yes
○No
○Not sure
B3. What was your main source of education or training related to AMR and/or One Health?
□Formal university curriculum
□Clinical training/placement
□Workshop/seminar
□Conference
□Online course
□Self-directed learning
□Student/research activities
□Other: ___
□ I have not received any such education/training

(C)AMR Foundations & One Health Understanding
C1. What is the primary goal of the One Health approach?

A) To focus exclusively on human clinical medicine in hospital settings.

B) To achieve optimal health outcomes by recognizing interconnections between humans, animals, and the environment. (Correct)

C) To replace traditional medical specialties with veterinary practices.

D) To regulate pharmaceutical drug prices across international markets.

C2. Which statement is correct regarding the professionals involved in One Health activities?

A) Only physicians and veterinarians can participate in One Health activities.

B) One Health involves a broad range of health, environmental, agricultural, and social disciplines. (Correct)

C) One Health activities are limited strictly to environmental research scientists.
D) Only clinical pharmacists are trained to lead One Health initiatives.

C3. How does inappropriate antibiotic use in livestock contribute to antimicrobial resistance (AMR) in humans?

A) Antibiotics used in livestock become completely inactive upon administration.
B) It promotes resistant bacteria and residues in the food chain that can transmit to humans. (Correct)

C) It only causes illness in animals without affecting human pathogen profiles.
D) It directly mutates human DNA upon consuming animal meat.

C4. Why is joint surveillance between human health and veterinary sectors important for AMR and zoonoses?

A) Animals cannot carry or transmit antimicrobial-resistant organisms.
B) Disease outbreaks in animals can serve as early warning signals for human risks. (Correct)

C) Veterinary surveillance eliminates the need for hospital-based infection reporting.
D) Human and animal infections are completely isolated and independent processes.

C5. Which statement best reflects the role of healthcare professionals in antimicrobial stewardship?

A) Stewardship is the sole responsibility of infectious disease specialists.

B) Stewardship requires active, collaborative engagement from medicine, pharmacy, and nursing. (Correct)

C) Nurses and pharmacists have no clinical role in antibiotic stewardship programs.
D) Antimicrobial governance applies only to outpatient community settings.

(D)Antimicrobial Stewardship & Appropriate Use
D1. Which of the following is the primary reason for using antimicrobials appropriately?
A) To reduce drug costs for healthcare institutions
B) To shorten the overall length of patient hospital stay
C) To prevent resistant organisms and reduce drug-related patient harm
D) To eliminate the need for diagnostic infection testing
(Correct Answer: C)

D2. Regarding your role in antimicrobial stewardship (AMS), which statement is most accurate?
A) AMS is strictly the responsibility of infectious disease specialists
B) Every healthcare professional has a direct role in reducing antimicrobial resistance
C) AMS concerns prescribing doctors only, not nurses or pharmacists
D) Student healthcare workers cannot contribute to AMS during their training

(Correct Answer: B)

D3. In which clinical situation is antimicrobial treatment indicated?
A) Uncomplicated viral upper respiratory tract infections
B) Asymptomatic presence of bacteria in urine in non-pregnant patients
C) Clear clinical or microbiological evidence of a bacterial infection
D) Routine prevention of infection in non-surgical patients
(Correct Answer: C)

D4. How does obtaining antibiotics without a valid prescription impact public health?
A) It improves treatment outcomes by enabling early therapy
B) It drives antimicrobial resistance through improper dosing and use
C) It has no significant impact on community resistance rates
D) It reduces the burden on emergency departments and clinics
(Correct Answer: B)

(E)Infection Prevention & Control

E1. A student performs hand hygiene immediately after removing gloves. Which statement is correct?
A) Gloves replace the need for hand hygiene.

B) Hand hygiene is still required after glove removal. (Correct)
C) Hand hygiene is only needed if gloves are visibly torn.
D) Hand hygiene is necessary only for isolation cases.
E2. According to IPC guidelines, Standard Precautions apply to:
A) Confirmed multi-drug resistant cases only.
B) Intensive care unit patients only.
C) All patients, regardless of infection status. (Correct)
D) Patients presenting with fever or cough only.
E3. Which practice is correct when collecting clinical specimens for microbiology?
A) Collect specimens after starting broad-spectrum antibiotics.
B) Use sterile technique, correct containers, and safe transport. (Correct)
C) Store all specimens at room temperature for 48 hours.
D) Transport unsealed containers directly to the lab.
E4. How does effective IPC contribute to controlling AMR?
A) It directly mutates bacterial resistance genes.
B) It prevents infections, reducing overall antibiotic use and spread. (Correct)
C) It is only needed after an outbreak occurs.
D) It eliminates the need for antibiotic stewardship programs.

E5. You observe a colleague failing to follow a key IPC procedure. What should you do?
A) Ignore it to avoid conflict.
B) Report it through proper supervisor or IPC reporting channels. (Correct)
C) Stop attending clinical rounds at that facility.
D) Post about the incident on social media.
E6. Why is interprofessional teamwork (Medicine, Pharmacy, Nursing) vital for IPC?
A) IPC is solely the responsibility of nursing staff.
B) Controlling resistant infections requires coordinated, role-specific actions. (Correct)
C) It allows doctors to delegate all IPC tasks to pharmacists.
D) It replaces the need for institutional guidelines.

(F)Diagnostic Stewardship, Laboratory & Surveillance

F1. When should a clinical specimen for microbiological culture ideally be collected from a patient with a suspected bacterial infection?
A) After completing a full course of empirical antibiotics.
B) Before initiating any antimicrobial therapy. (Correct)
C) Only after empirical antibiotic treatment has failed.
D) Immediately after the second dose of broad-spectrum antibiotics.

F2. Which statement best describes "Diagnostic Stewardship"?

A) Ordering as many laboratory tests as possible for every patient.
B) Ordering the right test at the right time to appropriately guide clinical care. (Correct)
C) Avoiding all microbiological testing to reduce laboratory expenses.
D) Allowing laboratory staff to dictate all prescribing decisions.

F3. A patient on broad-spectrum empirical antibiotics has a culture report showing a specific target pathogen. What is the most appropriate action?
A) Continue broad-spectrum therapy unchanged regardless of the results.
B) De-escalate to a narrow-spectrum antimicrobial targeted to the isolated pathogen. (Correct)
C) Add two additional broad-spectrum antibiotics to the regimen.
D) Stop all antibiotics immediately without reviewing the patient's condition.

(G)One Health Collaboration & Community Engagement

G1. What is the primary role of community engagement in controlling antimicrobial resistance (AMR)?
A) Enforcing financial penalties on individuals using non-prescribed antibiotics.

B) Partnering with local communities to raise awareness on hygiene and safe antibiotic use. (Correct)
C) Restricting all public health information to academic institutions only.
D) Replacing formal clinical care with informal community traditions.

G2. When responding to a suspected zoonotic disease outbreak, which collaborative action is most effective?
A) Managing the situation solely within human clinical facilities.
B) Forming a joint investigation team with veterinary and environmental health officers. (Correct)
C) Waiting for international agencies to handle all local fieldwork.
D) Suspending all data sharing between human and animal health sectors.

G3. How does interprofessional collaboration between medicine, pharmacy, and nursing benefit patient care?
A) It allows one discipline to make all clinical decisions without consultation.
B) It combines complementary expertise to optimize treatment and prevent resistance. (Correct)
C) It increases administrative paperwork without improving patient outcomes.
D) It transfers all medication prescribing responsibilities to nursing staff.

(H)Professional Responsibility, Ethics & Leadership

H1. What is the most appropriate professional action when observing a medication error or a breach of safety protocols that could harm a patient?

A) Ignore the incident to maintain friendly relationships with colleagues.

B) Report and document the concern through established institutional reporting pathways. (Correct)

C) Discuss the mistake on social media to alert the public.

D) Hide the documentation to protect the facility's reputation.

H2. How should a healthcare professional handle promotional incentives offered by pharmaceutical companies?

A) Accept incentives if they help increase personal income.

B) Decline any incentives that may compromise objective, evidence-based clinical decisions. (Correct)

C) Allow promotional gifts to influence drug selection for patients.

D) Prescribe the promoted drugs exclusively to meet company sales targets.

H3. Which approach best demonstrates effective leadership and interprofessional collaboration during a public health event?

A) Working in isolation without consulting other health disciplines.
B) Communicating respectfully and combining expertise across human, animal, and environmental sectors. (Correct)
C) Assuming one profession possesses all necessary knowledge to make decisions alone.
D) Rejecting input from non-medical professionals during outbreak investigations.

(I) Reported Curricular Exposure and Integration
I1. To what extent were the following topics covered in your university education?
AMR concepts and impact
Mechanisms and transmission of AMR
AMR epidemiology and surveillance
Appropriate antimicrobial use
Antimicrobial stewardship
Diagnostic and laboratory aspects relevant to AMR
IPC and prevention of AMR transmission
One Health concepts and their relevance to AMR
Not covered
Briefly covered
Moderately covered
Extensively covered
Not sure
I2. To what extent were the above AMR-related topics integrated across different courses or stages of your university education?

Not integrated
Minimally integrated
Moderately integrated
Extensively integrated
Not sure

(J) case-based scenarios

J1.During a community health project, a team reviews data showing a rise in Extended-Spectrum Beta-Lactamase (ESBL)-producing E. coli strains isolated from both local poultry farm runoff and clinical human samples in the same district. Which of the following actions best demonstrates an integrated One Health approach to address this antimicrobial resistance (AMR) issue?

A) Prescribing broader-spectrum antibiotics to all affected humans in the community.

B) Restricting antibiotic surveillance strictly to hospital-acquired infections.

C) Collaborating with veterinary and environmental health officers to monitor and limit non-therapeutic antibiotic use in agriculture alongside clinical surveillance.

D) Advising farmers to switch to different human-critical antibiotics for animal growth promotion.

J2.A 45-year-old female presents to the outpatient clinic with a 3-day history of nasal congestion, facial pressure, and clear nasal discharge following a viral upper

respiratory infection. She has no fever or severe pain and is hemodynamically stable. She demands an antibiotic prescription to clear it up fast. What is the most appropriate antimicrobial stewardship decision for the healthcare team?
A) Prescribe a 7-day course of Amoxicillin-Clavulanate immediately.
B) Educate the patient on symptomatic management, explain why antibiotics are unnecessary for viral infections, and offer a watchful waiting strategy.
C) Switch to Intravenous Ceftriaxone to prevent secondary bacterial complications.
D) Prescribe Azithromycin for 3 days as a prophylactic measure.

J3. A hospitalized patient is diagnosed with a severe wound infection caused by Methicillin-Resistant Staphylococcus aureus (MRSA). The ward is busy, and routine patient care procedures are ongoing. Which infection prevention and control (IPC) practice is most critical for the healthcare team to prevent cross-transmission to other patients?
A) Administering prophylactic oral antibiotics to all healthcare staff on the ward.
B) Implementing strict Contact Precautions (gloves and gown) and performing hand hygiene before and after patient contact.
C) Placing the patient in a negative-pressure airborne isolation room.

D) Doubling the dose of the patient's topical antiseptic washes without personal protective equipment.

J4. A 60-year-old male with suspected sepsis has blood cultures drawn. A rapid molecular diagnostic panel returns positive for Gram-positive cocci in clusters within 2 hours, but definitive organism identification and antimicrobial susceptibility testing (AST) will take another 48 hours. The patient is currently clinically stable on empiric broad-spectrum therapy. What is the most appropriate diagnostic stewardship action while awaiting definitive AST results?
A) Immediately stop all antibiotics until the final 48-hour AST report is released.
B) Continue broad-spectrum empiric coverage, review clinical status, and targetedly adjust therapy once identification/AST results are finalized.
C) Add anti-fungal coverage automatically based on the rapid panel result.
D) Discard the final culture request since the rapid panel provides all necessary clinical information.

J5. During interprofessional morning rounds, a physician, a clinical pharmacist, and a bedside nurse are reviewing a stable 72-year-old patient who has completed 5 days of IV Meropenem for a complicated UTI. Urine cultures now confirm E. coli is fully susceptible to oral Ciprofloxacin and Ceftriaxone. What

is the best example of collaborative interprofessional practice to optimize this patient's care?
A) The physician independently extends IV Meropenem for another 10 days without consulting the team.
B) The pharmacist and nurse recommend de-escalating to an appropriate oral antibiotic, while the nurse coordinates discharge monitoring and education.
C) The nurse stops the antibiotic immediately without a physician's order or pharmacist consultation.
D) The team ignores the culture report and continues the original broad-spectrum regimen until discharge.

J6. A healthcare student notices during a clinical rotation that broad-spectrum antibiotics are routinely prescribed for simple non-bacterial conditions due to patient demand and a lack of local institutional prescribing guidelines. Which response best reflects professional ethics and accountability in antimicrobial governance?
A) Comply quietly with the practice to avoid conflict with senior clinical staff.
B) Actively participate in clinical audits, support National Action Plan guidelines, and advocate for evidence-based prescribing practices within the institution.
C) Advise patients to buy antibiotics over the counter without a prescription.
D) Report the facility to non-medical public media outlets immediately.