

# **ESBL E.coli Tricycle project in Nepal**

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Regional Workshop on Interpretation of AMU/AMR data to improve  
evidence-based decision-making in Asia and the Pacific

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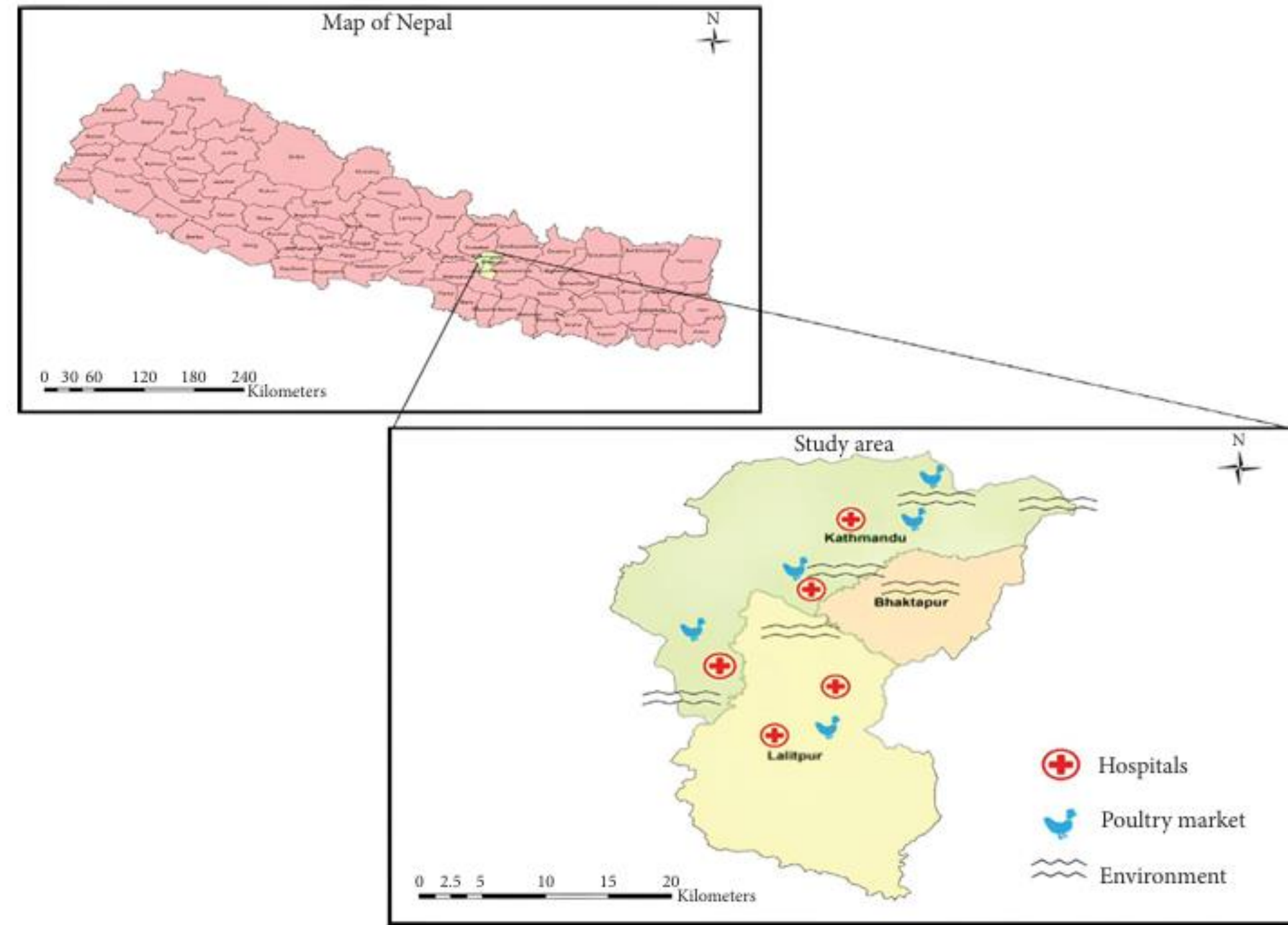
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## ESBL Tricycle Project Site Map

**Study Period: November 2021-  
December 2022**





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## Working package WP Leads, Sites and Sample Types

### WP1: Surveillance in Human

Lead: NPHL

Participating sites/hospitals

- TUTH
- Patan Hospital
- Kathmandu Model Hospital
- KIST medical college and teaching hospital
- Nepal Medical College

Sample: Blood from patients with BSI cases

Rectal swab from Healthy Pregnant Females-control

### WP2: Surveillance in Food chain(Broiler)

Lead: CVL

Site: Poultry markets

Sample: Caeca from poultry

### WP3: Surveillance in Environment

Lead: NPHL

Site : Various sources (upstream, downstream, communal rivers and hospital effluent)

Total:6

Working package WP



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# Key Findings



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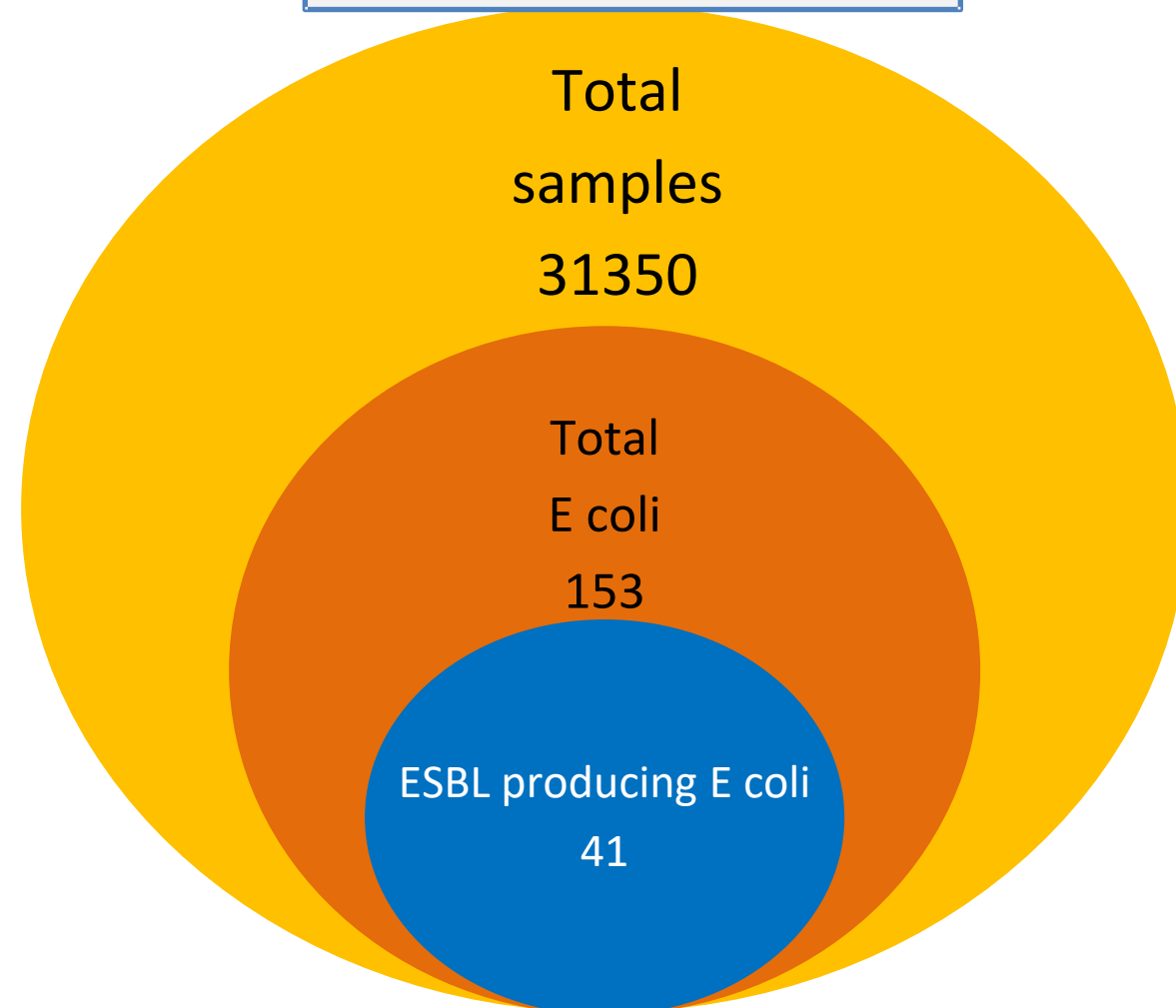


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# ESBL Producing *E. coli* in all three sectors

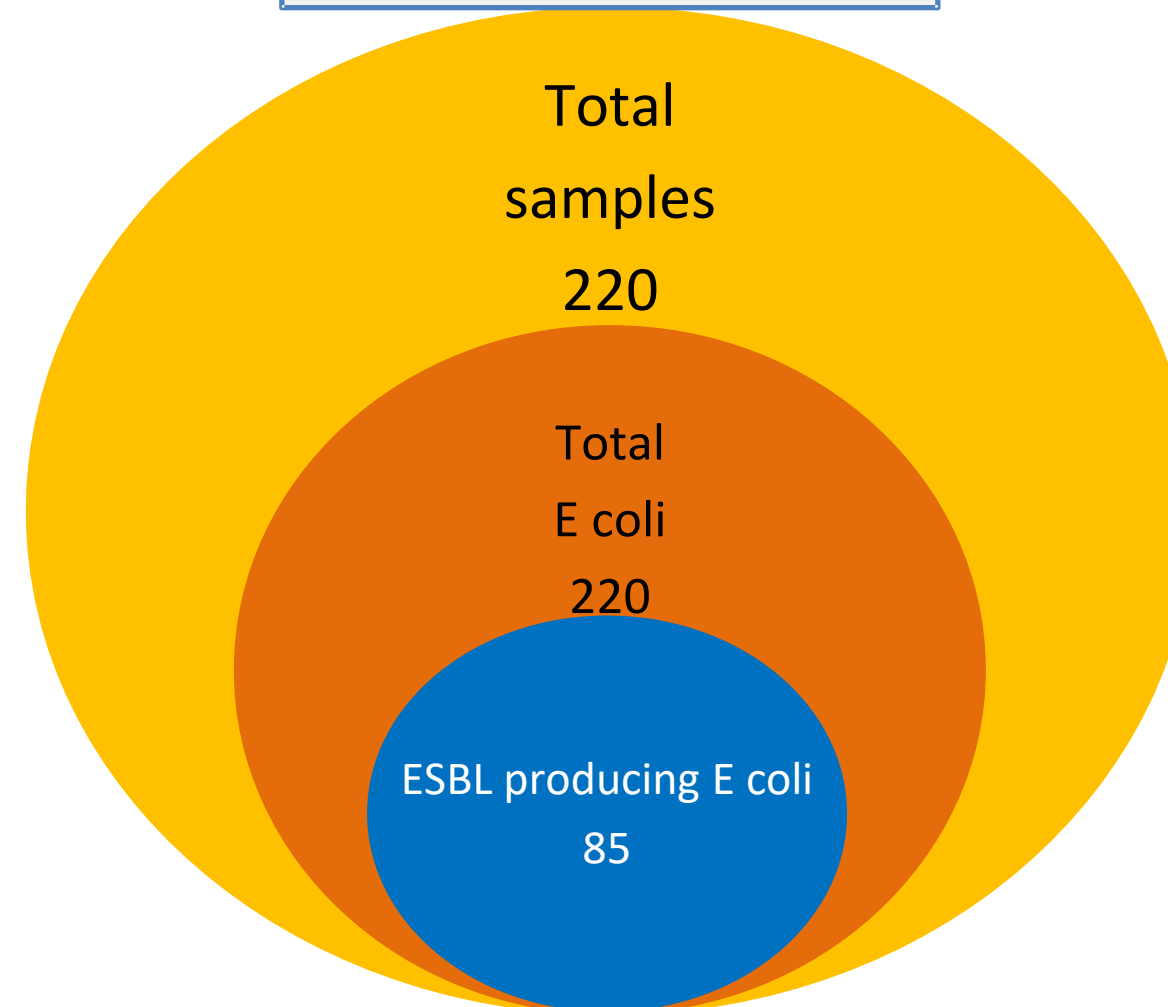
Human Surveillance

15% in controls and 49%  
in cases



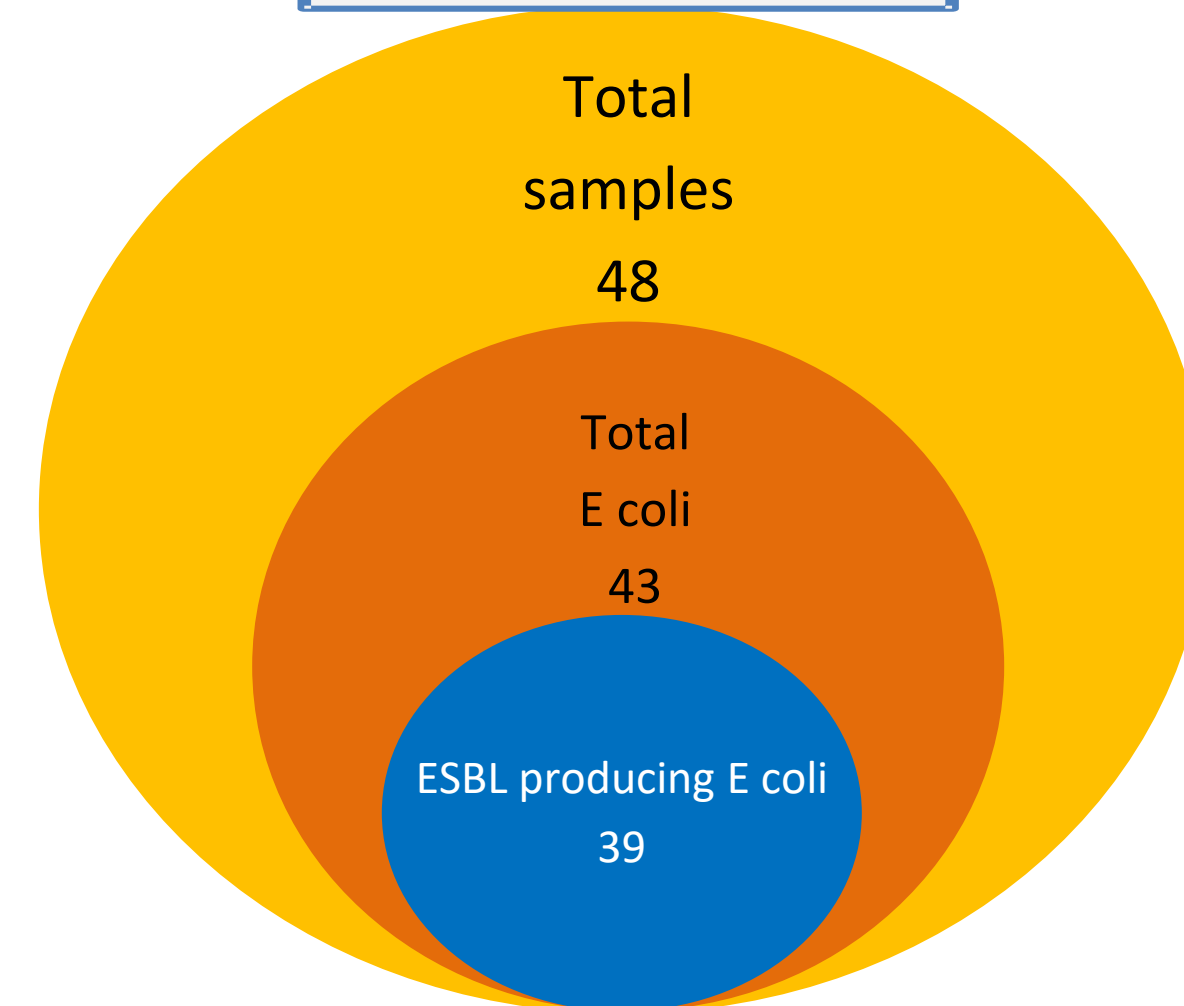
Animal (food chain)  
Surveillance

38.6% in poultry



Environment  
Surveillance

81% in water samples





# ESBL producing *E. coli* from human samples

Variable	Sites/Hospitals					
	A N(%)	B N(%)	C N(%)	D N(%)	E N(%)	Total
Case						
Total number of Blood cultures	13109	8635	3227	3154	3225	31350
Total bacterial growth n (%)	746 (5.6%)	1257 (14.5%)	64 (1.98%)	138 (4.3%)	130 (4.0%)	2335 (7.4%)
E. coli confirmed n (%)	85 (11%)	57 (5%)	14(22%)	27(20%)	12(9%)	195(8%)
E. coli from eligible cases n (%)	17(20%)	6(11%)	5(35%)	16(59%)	9(75%)	53(27%)
ESBL positive E. coli n (%)	9(53%)	4(67%)	4(80%)	9(56%)	0	26(49%)
Control						
Stool samples tested	20	20	20	20	20	100
E. coli isolated n (%)	20(100%)	20(100%)	20(100%)	20(100%)	20(100%)	100(100%)
ESBL E. coli confirmed (%ESBL)	5(25%)	2(10%)	5(25%)	0	3(15%)	15(15%)



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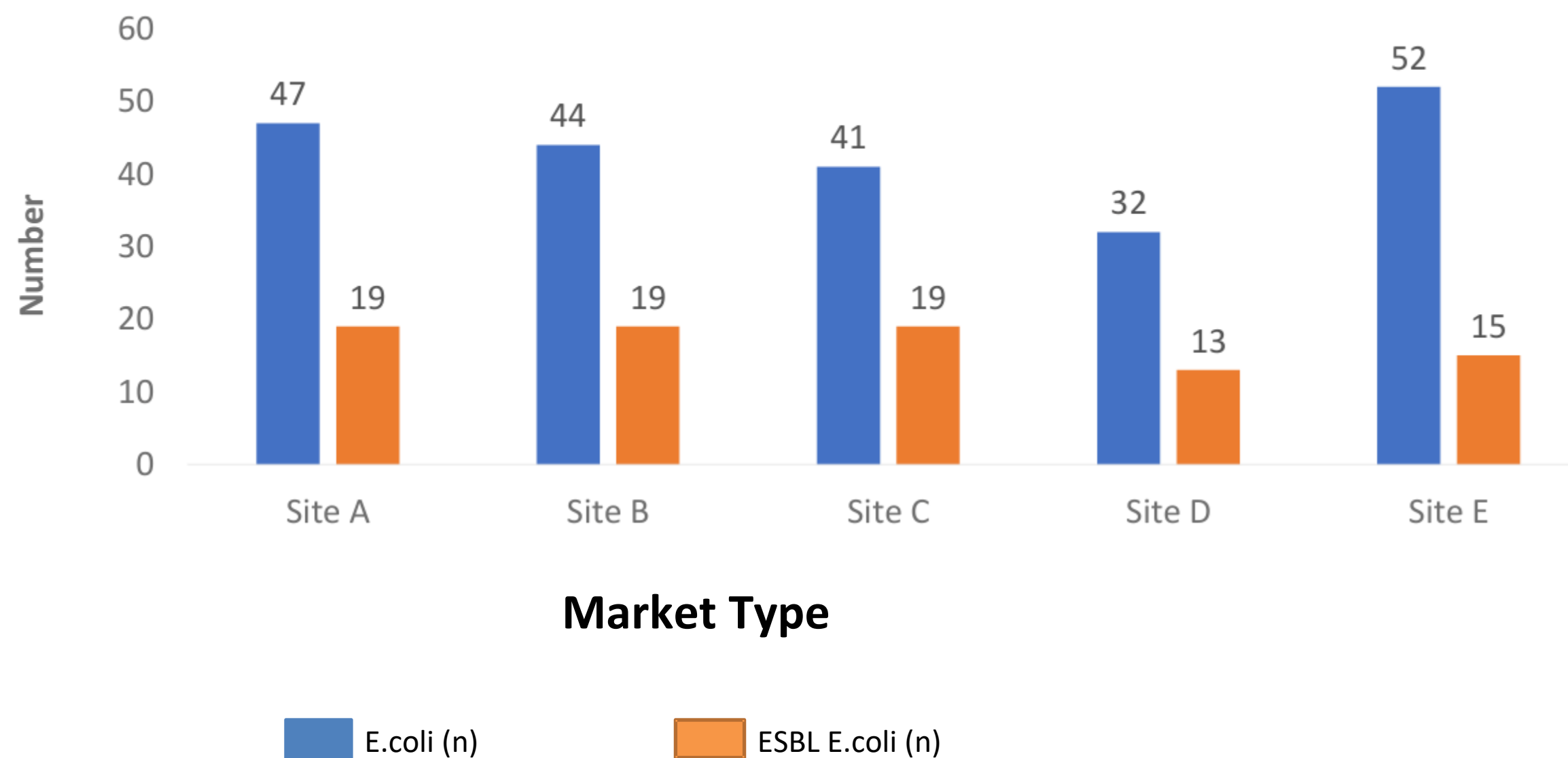


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## ESBL Producing *E.coli* in Poultry Sector (Food Chain)





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## ESBL Producing *E.coli* from Environment Sample

Source	N	Average		
		Concentration of E. coli (CFU/100ml)	Concentration of ESBL E. coli (CFU/100ml)	% ESBL producing E. coli
A(Upstream) Mulkharka	8	$2.7 \times 10^3$	0	0
B(Downstream) Jalbinayak	8	$3.6 \times 10^6$	$3.1 \times 10^5$	8.7
C(Communal) Sobhabhagwati	8	<b><math>7.1 \times 10^6</math></b>	$7.9 \times 10^5$	11.1
D(Communal) Manohara	8	$2.2 \times 10^6$	$2.1 \times 10^5$	9.3
E(Communal) Dhobikhola	8	$6.5 \times 10^6$	<b><math>9.5 \times 10^5</math></b>	<b>14.5</b>
F (Hospital effluent) KMH	8	$1.8 \times 10^6$	$1.8 \times 10^5$	10.2





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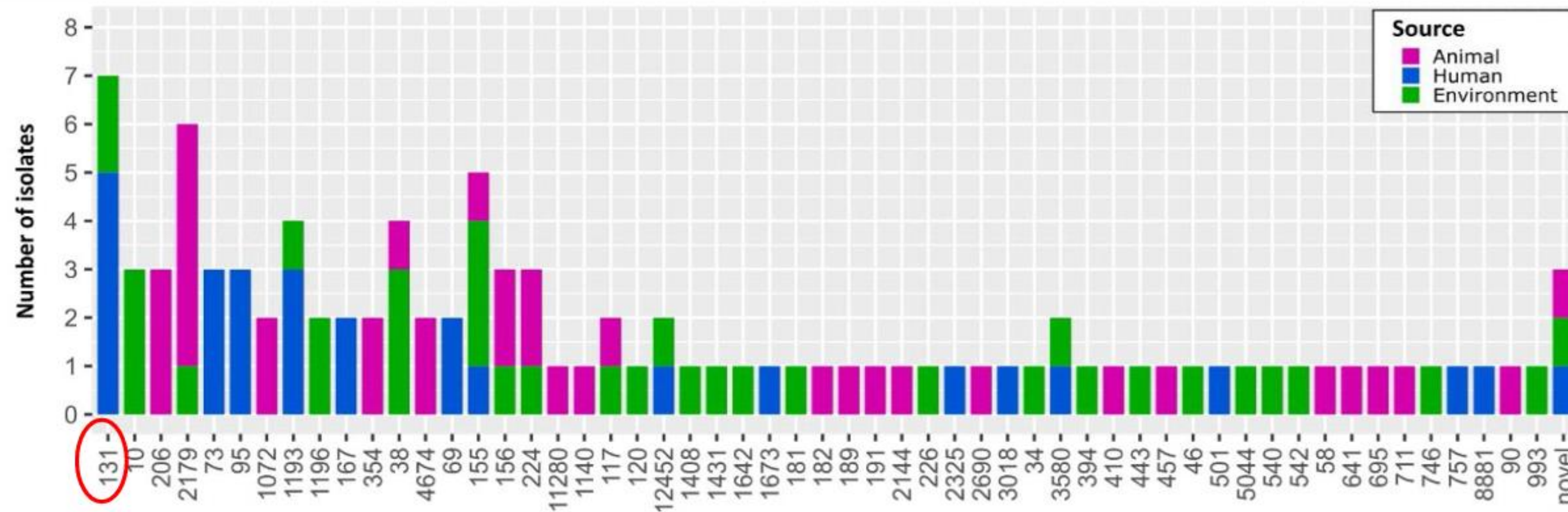
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## Key Findings: WGS Distribution of MLST and Phylogroups by Source

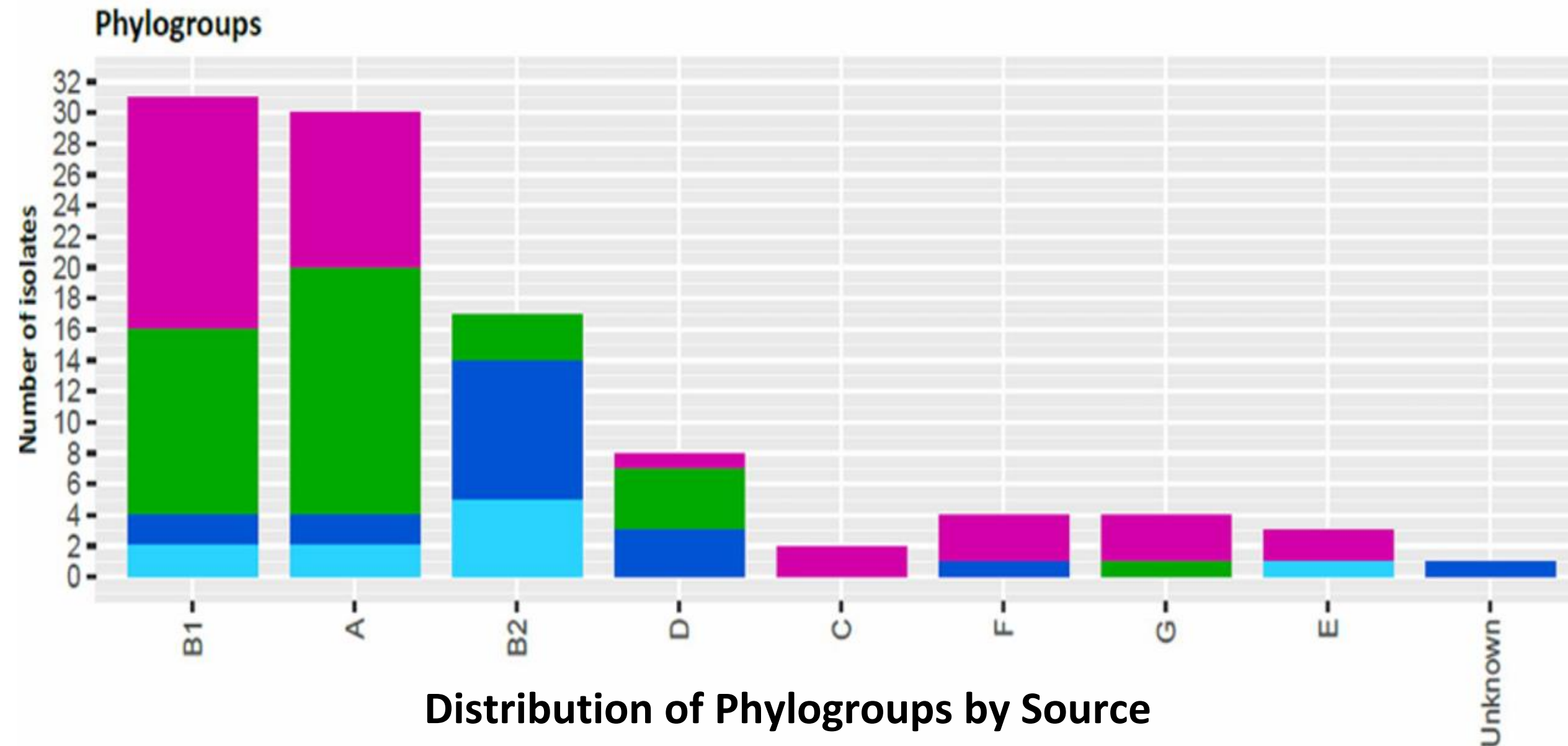
- 56 unique MLST profiles identified, including three novel sequence types.
- ST131 (n=7), a globally distributed pandemic *E. coli* lineage was the most prevalent.
- ST2179 (n=6) and ST155 (n=5), both *E. coli* lineages associated with zoonoses and AMR.
- ST38 & ST1193 (n=4 each) represent extraintestinal pathogenic *E. coli* of concern (strong association with MDR)





## Phylogroups

All eight recognized Phylogroups (A, B1, B2, C, D, E, F, and G) were observed in this Data  
A finding strongly supporting that the study dataset is both genetically and ecologically diverse





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## Usefulness

- First study in the country to address the circulation of antibiotic resistance from a One Health perspective.
- Established the possibility of monitoring of AMR across sectors in a coordinated manner.
- Provided baseline data based upon which strategies for the safe disposal of communal and hospital waste, integrated AMR surveillance, and control strategies could be planned and implemented.
- Establishment and capacity building of AMR surveillance in the environment sector
- Sharing of identical strains and resistance genes within and between sectors highlights the need for coordinated monitoring and intervention strategies across sectors.
- The National Action Plan on AMR provisions for integration of AMR surveillance data across sectors





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## Challenges/Limitations

- Epi and clinical data collection.
- Tricycle Protocol requires testing three to five different colonies per sample (for human control, poultry, and environment), and despite these being the predominant isolates within a sample, they may not represent the total genetic diversity of ESBL-producing *E. coli*.
- The dynamics of *E. coli* movement between sectors remains undetermined.
- Meeting sample size within the planned time frame (for human health case samples)
- Convincing participants for control samples (human)
- WGS for bacterial isolates in-country capacity yet to be built, outsourcing done for this

Thank you for your kind attention

