CASE-STUDY

A SEMI-QUANTITATIVE ASSESSMENT OF THE RISK OF ACQUIRING ESCHERICHIA COLI O157:H7 FROM CONSUMING INFORMALLY MARKETED MILK IN KENYA

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Framework

- Codex Alimentarius as a scientifically based process consisting of
- hazard identification
- hazard characterisation,
- exposure assessment
- risk characterisation

Hazard identification

- Milk consumed in households in Africa has a high *a priori possibility of contamination with* ***E. coli O157:H7*** *given the worldwide distribution of the pathogen, and* the low level of refrigeration and pasteurisation and several outbreaks in Africa have been linked with food and water

Hazard characterisation

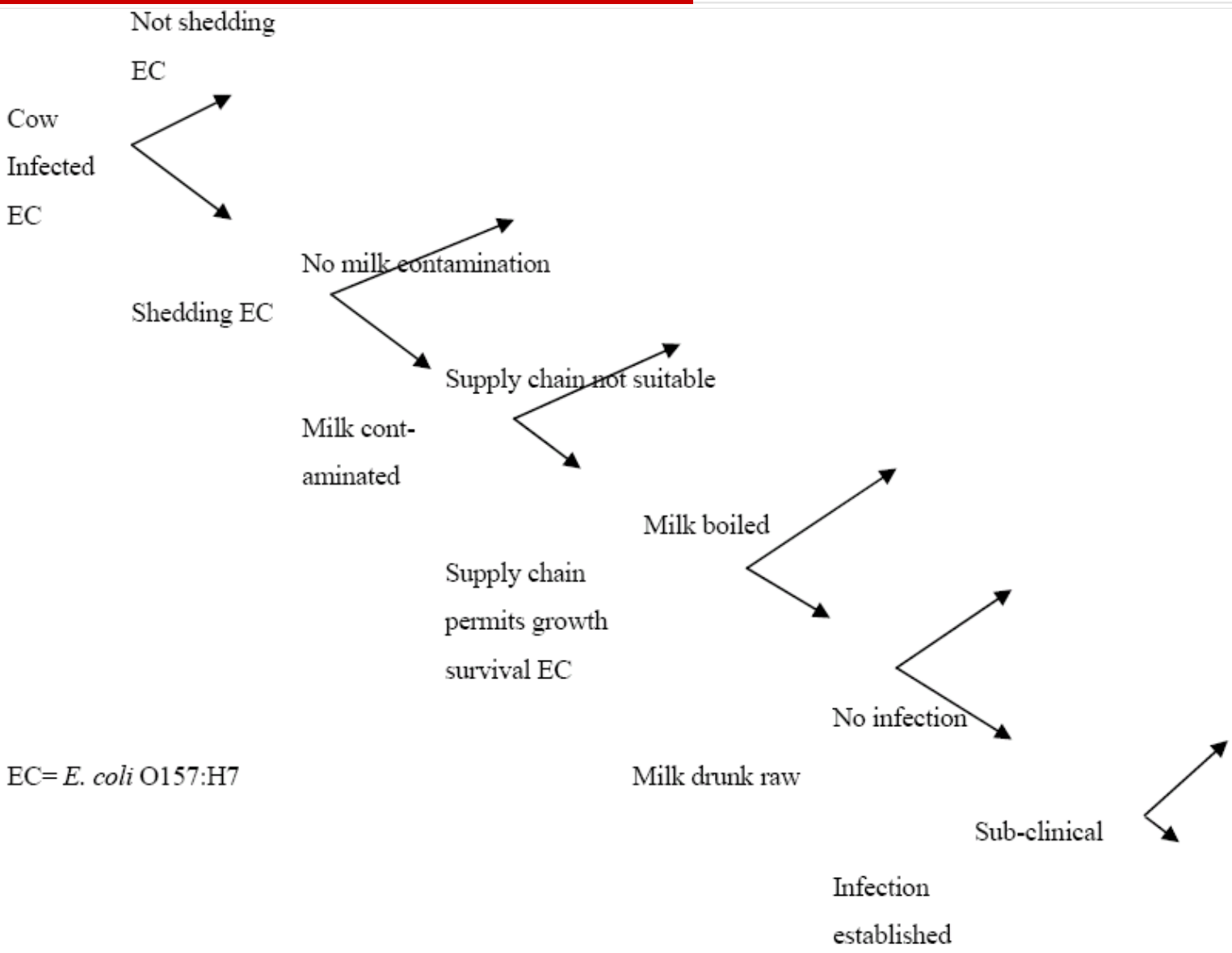
- *Milk from small-scale and large-scale producers:*
  - The infectious dose of E. coli O157:H7 (EC) appears to be very low, probably less than 100 organisms and possibly as low as 10.

Exposure assessment

- To describe the pathway from cow to milk consumer and identify steps where risk amplification or risk mitigation take place.

- The major conclusion was that exposure is likely to be low because smallholder chain offers few opportunities for mixing and growth as milk is partitioned into small volumes and the chain is short.

Event tree



EC= *E. coli* O157:H7

Probability estimation

Event	Factors increasing ri	Factors decreasing risk	Probability
Cow shedding EC		Shedding rates low	V low
EC present in cow milk		Isolation from milk low	V low
Infected milk contaminates other milk farm		Few cows producing low volum so there is little milk to contaminated.	V low
		Hygiene reasonably good	
Substantial EC growth during transpor	No cold chain	Low temperature (night) and sh duration as distances short (20-km)	V low
Substantial mixing with other m during transport		Traders transport small volumes a use small containers	
Growth in household	No cold storage	Milk typically immediate consumed	V low
Pre consumption processes do eliminate		Nearly all milk boiled befc consumption	V low
Many susceptible people	Demography HIV		Low

Source of data

Variable	Source of data
Drink raw milk (proportion)	Three studies giving proportion of urban people drinking raw milk were combined to give the best-guess, and the lowest and highest taken for best and worse case.
Infection (attack) rate	A search (EC, attack) and review (Su & Brandt, 1995) found 5 papers with data on attack rates which were used for best and worst case scenarios.
Susceptible (proportion)	A search (EC, asymptomatic) found 29 papers, 3 of which were combined to give the best-guess, and the lowest and highest taken for best and worse case scenarios.
Proportion households with infected milk	Data were from ongoing studies in Kenya were combined to give the best guess. Literature search d found 3 studies of prevalence in raw milk not associated with outbreaks (0, 0.004, 0.2). These were used for best and worse case.
Number in urban house	Data from study 3 was used as best guess; these were close to the latest official figures are from the Kenya census of 1989. Data from ongoing studies were used for high and low estimates.

(Literature searches carried out on: Medline, AGRICOLA, CAP, Biosis and FSTA)

Risk characterisation

- This analysis suggested that on any given day around 3 in 10,000 consumers will suffer clinical disease from drinking informally-marketed milk.
- Accounting for variation between studies, cases could be as little as 1 in a million or as many as 3 in 1000.
- Deterministic sensitivity analysis suggested that boiling milk has the greatest influence on reducing the number of symptomatic infections