

THE USE OF THE GRAPHIC METHOD IN TRACING THE
DISTRIBUTION OF MILK-CARRIED SCARLET FEVER
ILLUSTRATED BY AN OUTBREAK IN CLIFTON, IN
1900.

With Chart.

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THE Graphic Method, which I first used in connection with the outbreak of milk-carried enteric fever¹ which occurred in Clifton in 1897, is here applied to a similar outbreak of milk-carried scarlet fever.

The dairy-farm X is regarded as the source of infection. On this farm at the time of the outbreak a boy who had access to the milk vessels was suffering from an unrecognized illness which was compatible with a mild (ambulant) attack of scarlet fever, and within a week two brothers sickened with well-marked scarlet fever. The veterinary surgeon found no evidence of disease amongst the cows, and no other persons connected with the dairy-farm showed signs of illness.

The dairy-farm X supplied milk to two Clifton distributors Y and Z, and also distributed milk in the city direct from the farm; no other retailers obtained any milk from X.

These three distributors receiving X milk supplied 269 houses, of which 42 were attacked, furnishing 66 cases; that is, one in every 6·4 houses was attacked. During the same period 85 other distributors not receiving X milk supplied 6922 houses; and 9 cases occurred in as many houses, that is, one in every 769 houses was attacked, an incidence not indicating any unusual prevalence of scarlet fever in a large city. (Clifton has a population of 47,301. It is a registration sub-district of Bristol, which has a population of 324,973.)

Y obtained a part of his milk from a dairy-farm A, but as A also supplied the retailers D and E, whose rounds were absolutely free from scarlet fever, this farm is at once cleared from any suspicion.

¹ *Medico-Chirurg. Trans. of the Royal Med. and Chirurg. Soc. of London*, Vol. LXXXI. 1898, p. 125. *Transactions of the Epidemiological Society of London*, Vol. xvii. Session 1897—98, p. 78.

Z also obtained some of his supply from farmers B and C, but no cases were traced to their supplies except on rounds associated with the X supply.

Distribution of the Milk.

The dealer X, bringing in only milk from his own farm, distributed it first outside the city, with a record of 2 cases; the milk then entered Clifton.

X. Houses supplied	23	} 21%	Cases 8.
„ attacked	5		

The distributor Y, receiving milk in churns from farms X and A, affirmed his habit of mixing it before delivery, a statement borne out by the uniform implication of his three delivery rounds:—

Y 1. Houses supplied	31	} 25%	Cases 13.
„ attacked	8		
Y 2. Houses supplied	40	} 17%	Cases 11.
„ attacked	7		
Y 3. Houses supplied	30	} 23%	Cases 13.
„ attacked	7		

Y. Total houses supplied	101	} 21.7%	Cases 37.
„ „ attacked	22		

The distribution of Z milk, over an extensive round, is more complicated:—

The supply from farm X, about 50 quarts, was usually reserved for the supply of the district W, the chief incidence of the disease was upon two out of four streets in this district.

The milk was always distributed in this order:

W 1. The hand-can (holding about 2 gallons) filled by dipping from churn—usually X milk, occasionally B milk	Houses supplied	11	} 9%	Cases 2.
	„ attacked	1		
W 2. The hand-can filled a second time, always from X milk and carried round	Houses supplied	29	} 17%	Cases 7.
	„ attacked	5		
W 3. The hand-can filled a third time, always from X milk	Houses supplied	24	} 20%	Cases 6.
	„ attacked	5		
W 4. The hand-can filled a fourth time, usually from X milk, but when this ran short from B or C	Houses supplied	29	} None	Cases none.
	„ attacked	0		

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The immunity of W 4 street seemed at first remarkable, as it was on the supply from X churn, but as this street is invariably dealt with last, and as the infection probably occurred upon a single occasion, all the cases sickening within a few days, absolute exemption of W 4 street was quite likely to occur in the circumstance of the X supply running short on that particular day, which the distributor Z believes may have happened on or about Saturday or Sunday, the 13th or 14th October.

The W 1 round was amongst a different class of houses limited in number, and admittedly supplied on occasion from B; whereas W 2 and W 3 streets got no chance of exemption from the X supply, and suffered heavily.

The other general rounds (C₁, C₂, C₃) of this distributor in Clifton were as a matter of routine practice restricted to the milk supplied from farms B and C, but in order to make up quantity small portions of X milk were occasionally added.

Houses supplied	52	} 7.6%	Cases 6.
„ attacked	4		

This milk was sent out on three district rounds, one of which (C₁) remained exempt, the second had 1 case, the third showed 3 infected houses and 5 cases,