Commentary: Two views of cholera

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Edmund Parkes was a well-qualified choice to provide a critical assessment\(^1\) of John Snow’s second edition of the *Mode of Communication of Cholera*\(^2\) in the *British and Foreign Medico-Chirurgical Review*. A former military surgeon, Parkes had extensive experience of cholera in Asia. His monograph, *Researches into the Pathology and Treatment of the Algide or Asiatic Cholera*,\(^3\) had been published in London 8 years previously, and was dedicated, we might note, to the editor of the *Review*, his good friend John Forbes.

Parkes’ book was built around 47 autopsies of cholera victims conducted during cholera epidemics in Burma and Madras in the 1840s. Working in a military hospital, Parkes tended to see patients in the advanced stages of disease, and was more impressed by the cold, clammy appearance of his cholera patients (*algide* = cold) than by their copious diarrhoea, which several of his patients no longer had by the time he saw them. Although Parkes was aware of the marked thickening of the blood in cholera patients, unlike Snow he did not attribute it to dehydration from diarrhoea.\(^4\) For Parkes, the most important pathological finding was pulmonary vascular congestion, which we might now recognize as a reflection of dehydration and shock, whereas for Snow the key pathological event was the massive intestinal fluid loss. As to the communicability of cholera, Parkes asserted in 1847 ‘I have never observed any indication of contagion’.

Snow’s major clinical experience of cholera was as a teenage apprentice assigned to the Newcastle coal mines in 1832–33. He thus saw cholera at the front lines, and it is tempting to see here the difference in perspective between the primary care practitioner and the hospital specialist that still permeates modern medicine.

Parkes thus came to Snow’s book with some strongly fixed views, especially on pathology and communicability. In the book, Snow described with almost eerie exactness the pathophysiology of cholera—understanding, even then, that cholera kills via massive fluid loss from the intestines. This coherence with modern understanding, we must acknowledge, allows us to be drawn easily into to Snow’s argument on the mode of communication, which depends entirely on viewing cholera as a disease of the gut. Fecal-oral transmission made no sense to someone like Parkes who saw cholera as centrally a disease of the heart and lungs.

Parkes was as meticulous a dissector of arguments as of bodies, and he wielded his scalpel on each of Snow’s many examples of waterborne transmission, finding them all wanting, arguing that the case was not fully made, either because airborne transmission was not excluded or, more saliently, that Snow had a tendency to present numerator data when it was attack rates with appropriate denominators that were called for. He argued that the geographical distribution of cases around the Broad Street pump in Snow’s iconic map was perfectly consistent with a miasmatic, airborne interpretation of the diffusion of cholera. Perhaps Parkes had not yet seen Snow’s revised outbreak map, published in the Parish report on the outbreak 6 months after his book. That map...
included an irregularly-shaped dotted line circum-
scribing the area that was closer to the Broad Street
pump in walking distance than to any other street
pump. The line enclosed nearly all the cholera
deaths in the outbreak. 5

Although most of Parkes’ arguments seem of the
‘death- by-a-thousand-cuts’ variety that all who
have been subject to grant application reviews are fa-
miliar with, there is one place where Parkes thought
he detected a fatal flaw. The comparison of the two
water supplies of South London, where the epidemic
was most severe, occupied, as Parkes points out, half
of Snow’s book. One of the water companies
(Lambeth) had its Thames intake far upriver from
London, whereas the other (Southwark and
Vauxhall) took its water from mid-London, just
downriver from discharging sewer pipes. And in a
part of South London, those two water supplies
were thoroughly intermixed, with neighbouring
houses having either one supply or the other in ap-
parently random fashion. Snow viewed the area with
the intermixed supply as representing an ‘experiment
on a grand scale’, because a miasmatic, airborne
explanation of cholera could hardly explain differ-
ences in mortality within a population breathing the
same air.

But in presenting cholera mortality rates denomi-
naed to the number of houses supplied by each
company, Snow did not restrict his attention to the
intermingled districts of South London. Rather, the
mortality rates he provided were those of all recipients
of the two water supplies, and this included, notably,
four wealthy and elevated districts without any chol-
era deaths whose water supply was entirely from the
Lambeth Company.

Snow had pointed out, perhaps less clearly than he
might have, that whereas he knew how many houses
the two companies supplied in toto, he did not know
those numbers for the intermingled area. Thus the
argument Snow made, and the data he used to sup-
port it, were not entirely consistent with one another.

Weighed against this were Snow’s data showing
that fewer than 4% of South Londoners lived in the
privileged Lambeth-only area, and that Southwark
and Vauxhall water recipients had more than five
times the cholera mortality of the rest of London,
excluding the Lambeth-supplied. And when, in
1856, Snow published a paper with the previously
missing denominators, the powerful differences in
mortality remained. 6

Snow’s case for fecal-oral and waterborne transmis-
sion was not airtight. As Parkes pointed out, Snow
showed examples of cholera outbreaks that seemed
most reasonably explained by waterborne transmis-
sion, but frequently failed to take the argument fur-
ther to show that no alternative explanation was
possible. Snow appealed more to judgment than to
formal scientific proof.

Although the arguments Snow advanced for his
ideas contained a measure of advocacy, he had a
strong and clearly demarcated hypothesis, fully falsi-
fiable, which he tested, as well as he could, with the
material available to him. He did not shy away from
examples that might, at first glance, have contra-
dicted his thesis, but wrestled with them. 7 In pushing
past the frontiers of what he securely knew, in
not waiting until every possible objection could be
answered, he laid the foundation for preventing
waterborne diseases.

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