

be a patient in a distant part of the ward as one in the same four-bed bay. In fact this kind of partial subdivision "is without effect on the spread of infection". No one familiar with the facility with which air-borne particles circulate will be surprised at this finding in a ward so constructed.

A similar study³ published some years earlier was made in a thoracic surgical ward in which four-bed rooms, four single rooms, and a 10-bed room were connected by a long L-shaped corridor. The four-bed rooms were totally enclosed, but the doors to them were usually open. Here nasal carriage actually diminished after admission, but this may have been because patients received generous doses of penicillin as operation cover. Nevertheless, infections were acquired from patients in other rooms nearly as frequently as from those in the same room.

It seems evident that these bacterial migrations are likely to be prevented only by controlling air flow, and there have been several studies of the effects of this, with far from consistent results. In one of these⁴ part of a surgical ward to which uninfected patients were initially admitted was shut off from the rest and supplied with positive pressure ventilation. It seems from one Figure in this paper that nasal acquisition of staphylococci in this inner ward was considerably less than in the outer, but according to the authors "mechanical ventilation did not lead to any significant reduction in the degree of contamination of the air or in the rate of nasal acquisition of *Staphylococcus aureus*." In a later extension of this study both parts of the ward were mechanically ventilated, but the appearance of a type 84/85 multi-resistant staphylococcus with an exceptional capacity for spread led to the colonization of so many patients that its source in any one of them was untraceable. In another study⁵ in an experimental ward filtered air was supplied to patients' rooms and to three other areas at different rates, but information is not given about the direction of any air flow between them. The rate of nasal infection was somewhat lower than in two other wards not so ventilated, but this was true of only the first two weeks after admission, did not apply to tetracycline-resistant strains, and did not lead to any diminution in staphylococcal sepsis.

The most encouraging report on a system of this kind is one from Aberdeen⁶ which appeared a few months ago. The new ward there is of the "race-track" type, consisting of numerous completely enclosed single rooms and rooms containing four or five beds, opening on an inner corridor, which itself encloses a "service core". Air is supplied under positive pressure only to the patients' rooms, and passes thence centripetally to exhaust through the service core. Smoke tests consistently showed that the direction of flow was from the patients' rooms even when doors were open. Removal of patients to this ward from an old one of the "Nightingale" type, although the patients transferred included carriers of an endemic strain of staphylococcus which had been a serious cause of wound infection for two years, was followed not only by diminution in the rate of nasal infection, but by a great reduction in staphylococcal air counts and a 72% reduction in the frequency of exogenous wound infection. These achievements strongly suggest that a properly controlled system of ventilation in a subdivided ward can have the good effect which is theoretically to be expected from it.

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³ Lidwell, O. M., Polakoff, S., Jevons, M. P., and Parker, M. T., *Journal of Hygiene*, 1966, 64, 321.

⁴ Lidwell, O. M., *et al.*, *Journal of Hygiene*, 1970, 68, 417.

⁵ Whyte, W., Howie, J. G. R., and Eakin, J. E., *Journal of Medical Microbiology*, 1969, 2, 335.

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Worcestershire Sauce and the Kidneys

A little of what you fancy may do you good, but an excess may have the opposite effect. Among the contents of the kitchen shelf there are several which, if ingested in massive quantities over a long period of time, can lead to damage to the kidneys. These include milk and alkalis,¹ vitamin D,² analgesics,³ and purgatives.⁴ A less familiar possible nephrotoxin is Worcestershire sauce. In 1956 A. H. Douthwaite⁵ described the case of a 59-year-old man with chronic renal failure who habitually took half to one bottle of Worcestershire sauce each day. His blood pressure was raised, his urine contained protein and casts, the blood urea ranged from 76 to 110 mg/100 ml, and his urea clearance was 18% of normal. A month after ceasing to take Worcestershire sauce he had lost his symptoms and gained weight, his urine was free from protein and casts, and his blood pressure and blood urea had returned to normal.

More recently K. J. Murphy^{6,7} has reported five patients with renal disease for which none of the usual causes was apparent but whose taste for Worcestershire sauce had led to excessive intake—in one case by the "glassful". Three of them had bilateral renal calculi and a generalized aminoaciduria; one of the others had malignant hypertension and end-stage renal failure; and the remaining patient had moderate impairment of renal function, which seemed to improve after he stopped taking Worcestershire sauce. Proteinuria was present in three of the patients, and urinary acidification tests with ammonium chloride gave an abnormal result in all, usually a low titratable acidity and phosphate excretion but a normal ability to lower pH. Renal biopsy obtained in one of the patients without stones showed that some of the glomeruli were normal but that others were completely sclerosed or had organized crescents. There was a little diffuse interstitial fibrosis.

Worcestershire sauce contains acetic acid, garlic, black pepper, and a variety of other spices. Which, if any, of these may have a toxic effect on the kidneys is uncertain. The evidence against Worcestershire sauce is not yet strong enough to incriminate it, but it is sufficiently suggestive to make it worth asking patients with unexplained renal impairment or calculi about the condiments they take. Even if further cases should substantiate a connexion, Worcestershire-sauce nephropathy is unlikely to turn out to be a common disease, since presumably the population addicted to these enormous quantities is not large. Nevertheless, the discovery of another potentially reversible cause of renal failure is worth noting.

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³ Spuhler, O., and Zollinger, H. O., *Zeitschrift für klinische Medizin*, 1953, 151, 1.

⁴ Schwartz, W. B., and Relman, A. S., *Journal of Clinical Investigation*, 1953, 32, 258.

⁵ Douthwaite, A. H., *British Medical Journal*, 1956, 2, 958.

⁶ Murphy, K. J., *Lancet*, 1967, 2, 401.

⁷ Murphy, K. J., *Medical Journal of Australia*, 1971, 1, 1119.