



# Variola minor in England and Wales: the geographical course of a smallpox epidemic and the impediments to effective disease control, 1920–1935



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## ABSTRACT

The 1920–1935 epidemic of variola minor in England and Wales is a prime example of a major smallpox outbreak that spread in a national population with waning levels of vaccine-induced immunity. This paper examines the geographical course of the epidemic and the reasons why the disease was able to evade the (then) established protocols for smallpox control in many local government areas. The control issue is examined using archival records from the English county of Gloucestershire, where smallpox spread out of effective control in 1923. At the national level, our analysis demonstrates that the build-up (1920–1927) of the epidemic was characterised by a persistent core of reported cases of high intensity in the counties of central and northern England. Epidemic fade-out (1928–1935) was associated with an accelerated shift of disease activity to London and the southeast. Set against this national context, Gloucestershire represented a microcosm of the impediments to smallpox control in inter-war Britain. Here, a series of sociodemographic and administrative factors operated to impede disease control. Our study demonstrates the potential fragility of established disease control systems and the importance of professional and public cooperation, sometimes in the face of vehemently contested evidence over the nature of a disease and the means of its control, in attempts to limit the spread of epidemics.

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The 1920–1935 epidemic of smallpox in England and Wales is a prime example of a major smallpox epidemic that spread in a national population with waning levels of vaccine-induced immunity. The British Vaccination Acts of 1898 and 1907 had relaxed the mid nineteenth-century laws on the compulsory vaccination of infants so that, by the start of the 1920s, some 2.5 million or more children under twelve years old were legally exempted from smallpox vaccination in England and Wales.<sup>1</sup> It was at about this time that a distinctly mild form of smallpox, known as variola minor, began to spread through the susceptible population of Britain.<sup>2</sup> The ensuing

epidemic was associated with well over 81,000 notified smallpox cases (including 209 deaths) in almost nine hundred local government areas of England and Wales.<sup>3</sup> In some of these affected areas the outbreaks were rapidly contained and yielded just a few cases. In many others, however, the disease seemed to thwart the best efforts of local medical officers to assert effective control. In such areas, outbreaks continued for many months or years.<sup>4</sup>

A coherent national structure for the containment and control of

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<sup>1</sup> Ministry of Health, Small-pox and vaccination, *Reports on Public Health and Medical Subjects*, 8, London, 1921.

<sup>2</sup> F. Fenner, A. Henderson, I. Arita, Z. Ježek and I.D. Ladnyi, *Smallpox and its Eradication*, Geneva, 1988, 324–326; M.R. Smallman-Raynor and A.D. Cliff, *Atlas of Epidemic Britain: A Twentieth Century Picture*, Oxford, 2012, 37–41.

<sup>3</sup> Registrar-General for England and Wales, *The Registrar-General's Statistical Review of England and Wales*, London, 1923–1935.

<sup>4</sup> Ministry of Health, *Annual Report of the Ministry of Health*, London, 1922–1936; Chief Medical Officer, *On the State of the Public Health: Annual Report of the Chief Medical Officer of the Ministry of Health*, London, 1926–1935.

smallpox in England and Wales had emerged by the late Victorian period.<sup>5</sup> The development and standardization of vaccination practices in the first half of the nineteenth century had culminated in the Vaccination Act of 1853 and the compulsory vaccination of infants.<sup>6</sup> While vaccination was a prerequisite for the effective control of smallpox, Anne Hardy observes that uniformly high levels of vaccination coverage were limited by growing public apathy and the emergence of a vigorous anti-vaccination movement that opposed compulsion on political, medical and religious grounds.<sup>7</sup> Vaccination in infancy did not necessarily afford lifelong immunity to smallpox and, in the absence of compulsory revaccination, the Vaccination Acts failed to provide for the long-term protection of the adult population. Prompted by the resurgence of epidemic smallpox in London in the 1860s, a multifaceted 'stamping out policy' for smallpox control began to gain traction among sanitary departments. Evolving out of contemporary efforts to control the spread of rinderpest in cattle, the essential elements of stamping out as applied to smallpox included the early detection and notification of cases; the isolation of patients in homes, hospitals or other facilities; the disinfection of their lodgings, clothing, bedding and personal effects; and, in subsequent developments of the method, the (re)vaccination of people who had been in contact with cases.<sup>8</sup> With the creation of sanitary authorities and the appointment of medical officers of health in urban and rural districts under the Public Health Act (1872), Hardy suggests that:

The establishment in the 1870s and early 1880s of a coherent national preventive structure was probably crucial in limiting the opportunities for entry of virulent disease strains, and in raising the efficiency level of local preventive measures. The Infectious Diseases Notification Act of 1899, which made notification compulsory for the infectious diseases, including smallpox, nationally, finally completed this structure.<sup>9</sup>

From thereon, smallpox retreated as a significant cause of mortality

in England and Wales. Following the last major epidemic of severe smallpox in 1901–1903, sporadic cases and small outbreaks occurred in conjunction with known or suspected introductions, notably with the return of military personnel from Egypt, Macedonia and elsewhere at the end of the Great War.<sup>10</sup> As far as the evidence allows, however, smallpox had ceased to be endemic by this time.<sup>11</sup>

The smallpox situation in Britain took an unexpected turn with the appearance and spread of variola minor at the beginning of the 1920s. The aetiological and diagnostic challenges that this typically mild form of smallpox posed to the scientific community are explored by S.R.M. May, who identifies a reassertion of the importance of clinical medicine and epidemiology in disease recognition, management and control at this time.<sup>12</sup> Although the Ministry of Health described the spread of variola minor as an outstanding epidemiological feature of the 1920s, very little is known of the geographical patterns of epidemic transmission or the reasons why the disease was able to evade the existing machinery for smallpox control in many local government areas of England and Wales.<sup>13</sup> Against this background, the present paper first examines the challenge posed by variola minor and the geographical course of the national smallpox epidemic of 1920–1935. Then the impediments to effective disease control in areas severely affected by the disease are considered through the lens of the English county of Gloucestershire, a place that is famously and forever associated with smallpox through Edward Jenner's pioneering work on vaccination in the late eighteenth century.<sup>14</sup> Special interest also attaches to Gloucestershire on account of an early and particularly intense smallpox outbreak which, for a time in the spring and summer of 1923, spread out of effective control.<sup>15</sup> The outbreak garnered much attention in both the popular and medical presses and, as we show, represented a perfect storm of those factors that impeded effective smallpox control in many parts of inter-war Britain.<sup>16</sup> Above all, our study demonstrates the potential fragility of established disease control systems and the importance of professional and public cooperation – sometimes in the face of vehemently contested evidence over the nature of a disease and the means of its control – in attempts to limit the spread of epidemics.

### Smallpox and the challenge of variola minor

Prior to its global eradication in 1979, person-to-person

<sup>5</sup> For overviews of smallpox and its control in nineteenth-century Britain, see C. Creighton, *A History of Epidemics in Britain. Volume II: From the Extinction of Plague to the Present Time*, Cambridge, 1894, 434–631; C.W. Dixon, *Smallpox*, London, 1962. A general review of smallpox control efforts at this time is provided by Fenner, Henderson, Arita, Ježek and Ladnyi, *Smallpox and its Eradication*, 245–276.

<sup>6</sup> On the development of vaccination and associated legislation in nineteenth- and early twentieth-century England, see J.A. Dudgeon, Development of smallpox vaccine in England in the eighteenth and nineteenth centuries, *British Medical Journal* 1 (1963) 1367–1372; A.S. MacNalty, The prevention of smallpox: from Edward Jenner to Monckton Copeman, *Medical History* 12 (1968) 1–18; N. Williams, The implementation of compulsory health legislation: infant smallpox vaccination in England and Wales, 1840–1890, *Journal of Historical Geography* 20 (1994) 396–412.

<sup>7</sup> A. Hardy, Smallpox in London: factors in the decline of the disease in the nineteenth century, *Medical History* 27 (1983) 111–138; A. Hardy, *The Epidemic Streets: Infectious Diseases and the Rise of Preventive Medicine, 1856–1900*, Oxford, 1993, 110–150. The anti-vaccination movement in nineteenth-century England has attracted much attention from historians of medicine. See, for example, A. Beck, Issues in the anti-vaccination movement in England, *Medical History* 4 (1960) 310–321; D. Porter and R. Porter, The politics of prevention: anti-vaccinationism and public health in nineteenth-century England, *Medical History* 32 (1988) 231–252; Williams, The implementation of compulsory health legislation; N. Durbach, 'They might as well brand us': working-class resistance to compulsory vaccination in Victorian England, *Social History of Medicine* 13 (2000) 45–62; N. Durbach, *Bodily Matters: The Anti-Vaccination Movement in England, 1835–1907*, Durham, 2005.

<sup>8</sup> Hardy, Smallpox in London, 116; Hardy, *The Epidemic Streets*, 114–128; See also: E.P. Henneck, Vaccination policy against smallpox, 1835–1914: a comparison of England with Prussia and Imperial Germany, *Social History of Medicine* 11 (1998) 49–71; T. Crook, *Governing Systems: Modernity and the Making of Public Health in England, 1830–1910*, Oakland, 2016, 197–244.

<sup>9</sup> Hardy, Smallpox in London, 138. On the Victorian Public Health Acts, see C. Ham, *Health Policy in Britain*, sixth edition, Basingstoke, 2009, 8.

<sup>10</sup> Local Government Board, Thirty-first Annual Report of the Local Government Board, 1901–02. Supplement Containing the Report of the Medical Officer for 1901–02, London, 1901–2, xxxiii–xliii; Local Government Board, Forty-eighth Annual Report of the Local Government Board, 1918–1919. Supplement Containing the Report of the Medical Department for 1918–19. London, 1919, 83–92.

<sup>11</sup> Smallman-Raynor and Cliff, *Atlas of Epidemic Britain*.

<sup>12</sup> S.R.M. May, Understanding smallpox: variola minor in England and Wales, 1919–1935, unpublished DPhil thesis, Oxford University, 1999.

<sup>13</sup> Ministry of Health, *Annual Report of the Ministry of Health*; Fenner, Henderson, Arita, Ježek and Ladnyi, *Smallpox and its Eradication*, 324–326; Smallman-Raynor and Cliff, *Atlas of Epidemic Britain*, 40–41; S. Rafferty, Epidemic smallpox in England and Wales, 1920–35: variola minor transmission, with special reference to Gloucestershire, 1923–24, unpublished BA (Hons) dissertation, University of Nottingham, 2016.

<sup>14</sup> M. Dworetzky, S. Cohen and D. Mullin, Prometheus in Gloucestershire: Edward Jenner, 1749–1823, *Journal of Allergy and Clinical Immunology* 112 (2003) 810–814.

<sup>15</sup> G. Williams, *Angel of Death: The Story of Smallpox*, Basingstoke, 2010, 291–292; Smallman-Raynor and Cliff, *Atlas of Epidemic Britain* 40; Rafferty, Epidemic smallpox in England and Wales, 1920–35.

<sup>16</sup> See, for example, The smallpox epidemic, *The Times*, 23 June 1923, 9; Smallpox in the West Country, *The Times*, 26 June 1923, 12; Anonymous, The small-pox situation, *British Medical Journal* 2 (1923) 71; Anonymous, Story of the small-pox epidemic in Gloucester, *Lancet* 202 (1923) 625–627.

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