

PHLS functions, objectives and activities

The major objective of the Public Health Laboratory Service is to provide the most effective and efficient service possible to support the diagnosis, prevention and control of infections and communicable diseases in England and Wales. This objective is carried out by the detection of infection and infectious agents, epidemiological analysis, investigation of outbreaks, development of strategies for prevention and control, the provision of advice and relevant research. A second main objective is that of income generation, which mainly concerns the Centre for Applied Microbiology and Research (CAMR), and is met by research and development directed to the sale of services and the development of commercial therapeutic, diagnostic and other products.

Legislative background

In 1945 the Government decided to put the wartime Emergency Public Health Laboratory Service on a permanent footing as the Public Health Laboratory Service. The Medical Research Council (MRC) agreed to continue administering it on behalf of the Ministry of Health. Section 17 of the NHS Act 1946 authorised the Minister to provide a bacteriological service for the control of infectious diseases.

The PHLS Act 1969 transferred responsibility for the Service from the MRC to a new PHLS Board, established as a statutory body capable of acting in its own right as an agent for the Minister of Health. The Act also transferred the staff from MRC employment to the Board, and transferred property from the MRC to the Ministry.

The NHS Act 1977 (Schedule 3) incorporated the PHLS Board. Part I defined the formal constitution of the Board and Part II dealt with staffing and financial provisions. The PHLS Act 1979 extended the Board's powers by allowing it to carry out 'such other activities as in the Secretary of State's opinion can be conveniently carried out in conjunction with the Service'. This legislation enabled the Board to assume responsibility for the administration as a civil establishment of the former Microbiological Research Establishment of the Ministry of Defence at Porton Down, which the Board renamed the PHLS Centre for Applied Microbiology and Research.

The PHLS is administered by a statutory Board closely analogous to a Special Health Authority, but financed from the central funds of the DHSS. It is an essential part of the NHS, and its responsibility extends over the whole of England and Wales. PHLS staff are employed on NHS terms and conditions of service.

Organisation

The PHLS comprises 52 regional and area laboratories distributed throughout England and Wales (Figure 2), and 24 reference and special

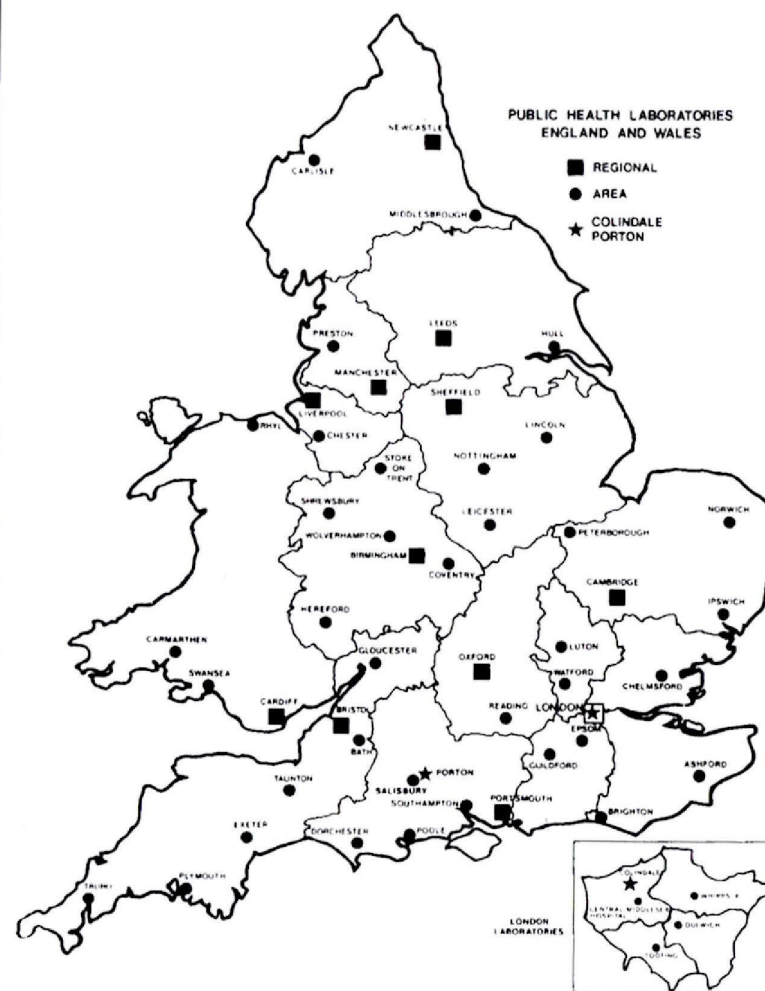


Figure 2 Where the PHLS laboratories are

Laboratories or units, most of which are grouped in the Central Public Health Laboratory (CPHL) in Colindale, or at CAMR, Porton Down. The Service is administered from the Board's Headquarters at Colindale, where the PHLS Communicable Disease Surveillance Centre (CDSC) is also situated. Costs of the regional and area laboratories, which in addition to their PHLS work provide microbiological services for their local hospitals, are shared with the corresponding health authorities.

General scope of the service

The PHLS operates a network of centrally co-ordinated laboratories in accordance with its statutory obligations, primarily to provide a microbiological and epidemiological service for the diagnosis, control and prevention of infections and communicable diseases. The PHLS is also concerned, especially by means of the research and development work of CAMR, to develop applications of biotechnology—mainly, but not exclusively, in the health field.

Role of PHLS laboratories The functions of a PHLS area or regional laboratory are to provide:

- Microbiological and epidemiological support for Medical Officers of Environmental Health (MOsEH), Environmental Health Officers (EHOs), DHSS and others, and for clinical staff in hospitals or in the community, within the PHLS catchment area of the laboratory.
- Full collaboration with PHLS Headquarters and central reference and epidemiological facilities in the reporting and investigation of infections, control of outbreaks, assessment of vaccines, development of laboratory methods, etc.
- Public health microbiology as required in its catchment area (eg testing of food, milk, water, sanitary, environmental and outbreak specimens).
- Access to virology diagnosis and advice.
- The microbiological service, including Control of Infection Officer functions, to the District hospital with which it is associated, and to general practitioners.

Although a number of these activities are carried out in NHS microbiology laboratories concerned primarily with the service to their district hospitals, the five functions together serve to define the ways which distinguish PHLS laboratories. These can be summarised as a commitment to public health and the control and prevention of infection and communicable disease in the population as a whole.

Epidemiology and control of infection Through its CDSC, the PHLS collates information on the prevalence of infection, and when necessary institutes special investigations into the epidemiology of particular infectious diseases. A major feature of the PHLS is its effectiveness in the face of outbreaks of infectious disease. The concerted efforts of microbiologists in peripheral and reference laboratories, together with the added epidemiological expertise of CDSC, can and does act to prevent, investigate and control outbreaks of infection in the community and in hospitals. The regular reports of laboratory-proven infections received at CDSC from PHLS and hospital laboratories, supplemented by other data, form a continuously changing up-to-date picture of communicable disease throughout the country. This is analysed and published weekly in the *Communicable Disease Report*, which is issued to microbiologists, community physicians and others concerned with disease control. In

addition, through its CDSC, the PHLS co-ordinates the investigation and control of incidents of communicable disease of national importance and of outbreaks involving many local authorities.

Diagnostic microbiology The regional and area PHLS laboratories are in or closely associated with, District hospitals, and provide their clinical microbiological and infection control services. They also serve GPs, MOsEH, other doctors caring for communities and EHOs. The laboratories report to CDSC infections diagnosed from all these sources. By means of this continuous sampling at 52 different points throughout England and Wales, the PHLS monitors the infections which bring patients to hospital or which attack them while they are there. The PHLS also becomes aware of the distribution of communicable disease and its causative microbes in the community. All PHLS laboratories assist local hospital laboratories in the investigation of outbreaks of infections, if requested.

Surveillance of food and drink All regional and area laboratories provide a microbiological service to the Environmental Health Departments of local authorities by examining water, milk and, increasingly, other food stuffs and environmental samples such as water from cooling towers. Imported foods are sampled at the port of entry or centre of distribution. Raw foods, particularly meat and poultry, and animal feeds known to spread agents of food poisoning, are monitored to trace the origin and transmission of these organisms. The survival or multiplication of food poisoning bacteria in foods is studied and, depending on the results, preventive measures are initiated. At CPHL both the Food Hygiene Laboratory and the Division of Enteric Pathogens contribute substantially to this work. In the course of investigating outbreaks, laboratories are often required to examine foodstuffs and are always ready to advise manufacturers and distributors; but routine testing for commercial organisations is not ordinarily undertaken.

Surveillance of vaccination and immunisation Evaluation of the effectiveness and safety of many of the immunisation programmes in current use falls to the PHLS Division of Epidemiology (of which the CDSC forms the main part), which also investigates new immunisation procedures. (Those relating to Hepatitis B are the separate responsibility of the Hepatitis Epidemiology Unit.)

Provision of reference and special facilities Many PHLS laboratories carry out some of the more specialised tests needed for diagnostic microbiology by neighbouring PHLS and NHS laboratories, and a number also provide a national reference service. The major back-up facilities are provided by the reference laboratories or units which carry out various tests for the PHLS and for hospital laboratories throughout the UK. These tests usually require special expertise, techniques and facilities

which it would be uneconomic or impossible to provide more widely. As well as carrying out special tests—such as the fingerprinting of microbes for epidemiological purposes—reference laboratories conduct research in their particular fields. This enhances the quality of the advice they are able to offer.

In the laboratories of CPHL and CAMR, the PHLS develops and produces certain therapeutic, prophylactic and diagnostic materials for use by the NHS and others, as well as itself. The PHLS also monitors some commercially available reagents and provides a range of test materials to its own and hospital laboratories to enable them to assess the quality of their diagnostic performance. The National Collection of Type Cultures (of bacteria of medical interest) has long been a constituent part of CPHL; more recently, the European Collection of Animal Cell Cultures has been established at CAMR.

Research and development PHLS laboratories engage in research, and several—especially the reference and special laboratories—have extensive research programmes. An element of research must feature in the work of all diagnostic laboratories if they are to develop cost-effective improvements in methods or introduce tests for newly-discovered pathogens, such as the AIDS virus. The successful investigation of outbreaks also frequently depends upon a research approach. PHLS laboratories frequently join in collaborative investigations, for example to evaluate new tests or to study the epidemiology of an infection. CAMR in particular has a substantial programme of research and development in the sciences underlying biotechnology processes and their application.

The projects at CAMR are broadly of three kinds—in-house research, where the costs are a charge to PHLS funds; grant-supported research, where individual scientists have been awarded grants by bodies sponsoring research; and commissioned projects which are the subject of a contract with a commercial firm or other organisation. Commissioned research generates income (to the Exchequer) as may, ultimately, some of the in-house projects—a process which the Distributorship and Marketing Agreement concluded in 1985 with Porton Products Ltd should facilitate.

The Service can, at short notice, call on the very wide range of knowledge and ability of its nationally distributed specialist staff. Working parties with appropriate skills can be formed to tackle new problems as they arise, so achieving the highest probability of producing speedy and useful results.

Acceptance of specimens

The materials examined in PHLS laboratories comprise clinical specimens (throat swabs, blood, faeces, etc) from people suspected of suffering from microbial disease, or of being carriers of pathogenic microbes; and non-clinical (sanitary and environmental) specimens, such as food and water, submitted either as part of an epidemiological inves-

tigation or for public health surveillance. Acceptance of a specimen for examination is at the discretion of the laboratory Director. Normally there is no charge for examination. Clinical specimens are dealt with if submitted by medical practitioners, veterinarians, dentists or those acting directly on their behalf. Sanitary specimens can be submitted by MOsEH and EHIOs (or members of their staff) acting on behalf of local authorities, or by others subject to the agreement of the laboratory Director.

The services of the reference and special laboratories are available to all PHLS, NHS and other official laboratories in the United Kingdom.

The advisory role of the PHLS

The PHLS is often asked to advise central and local government and the hospital service on many aspects of infections and communicable diseases. Consultation is frequently initiated by the PHLS, whenever local observation or central analysis reveals an infection problem that may require active study or intervention. The PHLS maintains close contact with veterinary organisations in areas of mutual interest, and collaborates with the World Health Organisation and with national laboratory and epidemiological services overseas. Particularly at CAMR, there is collaboration with commercial organisations on ways of applying microbiological expertise to industrial problems.

Prevention of infections and communicable diseases

The various activities referred to above combine to form a strong national resource for the prevention of infections and their spread. The PHLS response to outbreaks allows the earliest implementation of intervention and control measures. Equally, the diagnostic surveillance activities, research and development, reference work and advisory work are all directed, not only to the diagnosis and treatment of infection but, more significantly in terms of national health, to disease prevention.

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