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**Streptococcus suis guidelines in Viet Nam**

**Stimulating the development of national Streptococcus suis guidelines in Viet Nam through a strategic research partnership**

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**Abstract**

**Problem** *Streptococcus suis* is a common cause of adult bacterial meningitis in Viet Nam, and possibly other parts of Asia, yet this disabling infection has been largely neglected. Prevention, diagnosis and treatment are relatively straightforward and affordable but, in early 2007, no national diagnostic, case management or prevention guidelines existed in Viet Nam.

**Approach** Enhanced detection of *S. suis* infections was established in 2007 as part of a collaborative research programme between the National Hospital for Tropical Diseases, a key national hospital with very close links to the Ministry of Health, and a research group affiliated with Oxford University based in Viet Nam. The results were reported directly to policy-makers at the Ministry of Health.

**Local setting** Viet Nam is a low-income country with a health-care system that has seen considerable improvements and increased autonomy. However, the system remains fairly centralized with the Ministry of Health.

**Relevant changes** Following the improved detection and reporting of *S. suis* cases, the Ministry of Health issued guidance to all hospitals in Viet Nam on the clinical and laboratory diagnosis, treatment and prevention of *S. suis*. A public health laboratory diagnostic service was established at the National Institute of Hygiene and Epidemiology and training courses were conducted for clinicians and microbiologists. Ministry of Health guidance on surveillance and control of communicable diseases was updated to include a section on *S. suis*.

**Lessons learnt** Research collaborations can efficiently inform and influence national responses if they are well positioned to reach policy-makers.

**Introduction**
Streptococcus suis is a bacterial pathogen that has its natural reservoir in pigs but can infect humans, causing meningitis, septicaemia, endocarditis and arthritis. Infection can result in severe disease, with mortality of 3–18%, and hearing loss in up to 66% of survivors. It is probable that exposure to infected pigs and pork products are the main risk factors.

The first reports of human S. suis infection in south-east Asia were in China, Hong Kong Special Administrative Region in 1984 and cases have subsequently been reported in Japan and Thailand. However, it was not until a large outbreak in Sichuan province, China in 2005 that interest in this pathogen grew and S. suis is now increasingly recognized as a major cause of bacterial meningitis in south-east Asia. Despite this increased interest, it is probable that the burden of S. suis is considerably under-estimated since clinical awareness is low and many smaller hospitals do not possess a microbiology service. Even in hospitals with a microbiology service, infection may be misdiagnosed as a viridans group streptococcus or Enterococcus.

Considerable scope exists for improving the prevention, recognition and treatment of S. suis. The clinical picture and patient demographics can be distinctive and laboratory identification is not complicated, requiring the use of biochemical tests to differentiate S. suis from other streptococcal species. S. suis isolates are generally sensitive to penicillin and the risk of the most important long-term sequela, deafness, can be reduced by the use of steroids. Therefore, S. suis is readily treatable with affordable and accessible drugs. The risk of infection might be reduced through education of people who work with and butcher pigs, through enforcement of changes in butchering practices and through efforts to change dietary habits.

S. suis was detected in southern Viet Nam as early as 1997 but by 2007 this important pathogen was still not mentioned in national guidelines on the diagnosis, treatment and prevention of meningitis. This paper presents our experience of rapidly influencing the development of national guidelines through a research partnership between an influential national institute and an external academic group.

Local setting
Viet Nam is a low-income country that has made impressive achievements in improving health. The health-care system has seen considerable changes, with
improved facilities and services, increased autonomy and the implementation of a social health insurance system. However, significant challenges remain, particularly in the areas of cost containment and quality of care. Although several laws have given more autonomy to health departments and health facilities, parts of the system remain fairly centralized with the Ministry of Health retaining responsibility for many functions, including the development of guidance on disease prevention, diagnosis and clinical management.

Challenges

The burden of *S. suis* in Viet Nam is difficult to quantify and awareness is low since most hospitals do not have the diagnostic resources to identify the organism. Although the international biomedical literature contains some publications on *S. suis*, language barriers and access difficulties mean that the information is not readily available to most Vietnamese clinicians. Alerting clinicians to the importance of *S. suis* is difficult since channels for disseminating knowledge and guidance are limited. The Ministry of Health is active in developing clinical and public health guidelines through central directives but there are few other stakeholders, such as professional associations, producing guidelines.

Response

The National Hospital for Tropical Diseases (NHTD) is a 200-bed tertiary care centre for infectious diseases in northern Viet Nam. Unlike most hospitals in Viet Nam, NHTD is a specialist hospital under the direct control of the Ministry of Health and is close to the Ministry of Health both geographically and managerially. In 2006 a research partnership was established between NHTD and the Oxford University Clinical Research Unit. A key reason for developing this partnership was to maximize the impact of clinical research through the close relationship between NHTD and the Ministry of Health.

Shortly after the research unit and laboratories were operational at NHTD, an investigation was started into cases of purulent meningitis identified as being caused by *Aerococcus viridans* or *Streptococcus species*. It was decided to re-test a selection of stored strains from late 2006 with API 20 strep (Biomerieux, Lyon, France). The strains were identified as *S. suis* and this was confirmed by a *S. suis* serotype 2 polymerase chain reaction. After this finding, it was decided that all streptococci
isolates from blood and cerebrospinal fluid should be tested with API 20 Strep. Real
time polymerase chain reaction diagnostics for *S. suis* were introduced in April 2007.

**Impact**

After introducing enhanced diagnostics, *S. suis* became the most commonly identified
pathogen in adults with suspected meningitis at NHTD. Between January and May
2007, 19 cases of *S. suis* meningitis were detected and 50 cases were detected for the
entire year (Fig. 1). Of 562 cerebrospinal fluid specimens submitted for
microbiological analysis during 2007, we identified 11 *Cryptococcus neoformans*,
3 *Streptococcus pneumoniae*, 3 *Streptococcus species*, 1 *Enterobacter cloace* and 43
*S. suis*. An additional 7 patients had *S. suis* identified in blood cultures. Of the 50
patients with *S. suis*, 26 (52%) recovered completely, 21 (42%) recovered with
sequelae and 3 patients died. Hearing loss was the most common sequela (38%).

The identification of *S. suis* as the commonest cause of bacterial meningitis at
NHTD was reported to the Ministry of Health in May 2007. Within 4 months, the
Ministry of Health issued national guidelines on *S. suis* (Ministry of Health Decision
3065 / QD-BYT, dated 16 August 2009). The guidelines contained a description of
the clinical syndrome and the organism, recommendations on microbiological
diagnosis, a recommendation to treat suspected cases with ampicillin, a third
generation cephalosporin and intravenous corticosteroids (methylprednisolone 0.5–
1mg/kg/day). These guidelines were sent to all hospitals in Viet Nam and received a
lot of local media coverage. Although the treatment of suspected bacterial meningitis
with ampicillin and a cephalosporin was standard practice before promulgation of the
national *S. suis* guidelines, steroids were not recommended routinely for non-
tuberculous bacterial meningitis in adults.3

In August 2007 the National Institute of Hygiene and Epidemiology, the local
World Health Organization office and our research group held a meeting to discuss
the public health challenges of *S. suis*. The National Institute of Hygiene and
Epidemiology and three regional public health institutes then received training on the
identification of *S. suis* from human clinical specimens.

In November 2007, the preventive medicine branch of the Ministry of Health
issued updated guidelines on the surveillance and control of communicable diseases.
For the first time the guidelines included a section dedicated to *S. suis*. They included
advice not to slaughter or consume sick pigs, to cover wounds and wear protective equipment during slaughtering of pigs, and not to consume undercooked pork.

The Ministry of Health has not established a surveillance system for *S. suis* so it is not possible to assess the impact of the guidelines on the incidence and clinical outcome of *S. suis* infections. However, 44 cases of *S. suis* were diagnosed at NHTD during 2008, so it is clear that *S. suis* remains an important health problem.

**Recommendations**

It is well recognized that developed and developing countries both have difficulties in ensuring that research findings influence policies and practices. However, in resource-poor settings, where the population is more vulnerable, the opportunity costs greater and the consequences of poor policy more serious, the relative importance of the influence of research on policy may be greater. Demonstration of the relevance of health research is also essential for the grass roots credibility of the research team.

There are many obstacles to translating evidence into policies and practices that have been well documented. The causes are diverse and apply both to the researchers and policy-makers. In fact, it could be argued that the duty of policymakers to seek out the best evidence is equally weighted by the duty of publicly funded researchers to seek to influence policy. Rigorous evidence is not enough if the evidence can only been found in inaccessible journals written in impenetrable scientific language. It is not enough to publish and pray for percolation. A common difficulty is that the process of policy formulation is often not well characterized or mapped. And for those sitting outside the policy-making forum, channels to formally challenge or develop policy may be obscure. But Ministries of Health often outsource expertise and it can be very useful to identify these spheres of influence. Indeed, policy-makers have identified personal contact with researchers as the most important factor influencing decisions about use of research information.

Our experience illustrates that a scientific partnership between an international research group and an influential national institute closely linked to government can have an immediate impact on national policies. Identifying and using the pathways to policy and giving evidence prominence through prominent figures can profoundly improve the chances of effecting change.
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None declared.

References


**Fig. 1.** Number of *S. suis* cases diagnosed per month during 2007 at the National Hospital for Tropical Diseases.

**Box 1. Lessons learnt**

Engaging with research partners who have influence with government and policy-makers will maximize the chances of research having an impact locally.

Reporting of simple research data directly to policy-makers can have more impact than publishing in the biomedical literature.

It is important to identify local "pathways to policy" and use prominent figures or institutions to lobby for change.