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Syphilis screening and treatment in China

This online first version has been peer-reviewed, accepted and edited, but not formatted and finalized with corrections from authors and proofreaders.

Monetary incentives for provision of syphilis screening, Yunnan, China

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(Submitted: 24 January 2017 – Revised version received: 8 June 2017 – Accepted: 9 June 2017 – Published online: 1 July 2017)

Abstract

Problem Early detection of syphilis-infected people followed by effective treatment is essential for syphilis prevention and control.

Approach Starting in 2010 the local health authority in Yunnan province, China, developed a network of 670 service sites for syphilis testing, diagnosis and treatment or for testing-only with referral for further diagnosis and treatment. Point-of-care tests for syphilis and syphilis interventions were integrated into the existing human immunodeficiency virus (HIV) prevention and control programme. To improve the syphilis services, a pay-for-performance scheme was introduced in which providers were paid for testing and treating patients.

Local setting Yunnan province is the region hardest hit by HIV infection and disproportionately burdened with syphilis cases in China.

Relevant changes The proportion of attendees at voluntary counselling and testing clinics who were tested for syphilis increased from 46.2% (32 877/71 162) in 2010 to 98.2% (68 012/69 259) in 2015. Syphilis-infected cases treated with the recommended therapy increased from 26.6% (264/993) in 2010 to 82.5% (453/549) in 2015 at designated testing, diagnosis and treatment sites.

Lessons learnt The strategy greatly increased the uptake of syphilis testing and treatment among people at risk. Introduction of point-of-care tests for syphilis increased coverage of the testing services. Introduction of a pay-for-performance scheme seemed to motivate health-care providers to undertake syphilis intervention services.

Introduction

Syphilis is a sexually transmitted disease caused by the bacterium Treponema pallidum subspecies pallidum. Approximately 3 million people aged 15–49 years were infected with syphilis in China in 2011,1 accounting for a large proportion of the estimated 17 721 000 cases globally in 2012.2 Despite continuous efforts to promote condom use,3 syphilis transmission has not been prevented effectively, resulting in an increase of reported cases in...
the country since 2000. To control the epidemic, the health ministry in China in 2010 launched its national programme for prevention and control of syphilis (2010–2020).

Based on evidence from pilot studies, syphilis control efforts in China include early detection of infection through enhanced screening efforts followed by treatment of infected cases. The core intervention strategy has been described as the three-by-one approach, meaning that there are three entry points to screening linked to one standardized mode of care. The three settings are: (i) sexually transmitted disease clinics; (ii) human immunodeficiency virus (HIV) testing clinics (usually voluntary counselling and testing centres, and methadone maintenance treatment centres); and (iii) out-of-clinic settings where outreach services are delivered to sex workers and men who have sex with men. Standardized care provided to infected people consists of treatment with benzathine benzylpenicillin, behavioural interventions and partner notification. Screening also started in antenatal clinics after 2011 when syphilis was integrated into a separate programme for prevention of mother-to-child transmission of HIV and hepatitis B virus. We describe the approaches used to scale-up the syphilis screening and treatment interventions in Yunnan province.

Local setting
Yunnan province, with a population of 47 million in 2015, is located in the south-west of the country and is the region hardest hit by HIV infection in China. By the end of 2010, the cumulative reported number of people with HIV infection and acquired immune deficiency syndrome (AIDS) in Yunnan was 83 925; accounting for 21.0% of the total national figure of 399 643. The province is also disproportionately burdened with syphilis cases. Approximately 7000 people with different stages of syphilis infection were reported in 2011 among 45 966 362 residents, an incidence of 15 per 100 000 people. To respond effectively to the increasing epidemic of HIV, a province-wide campaign to prevent and control HIV/AIDS was initiated in Yunnan in 2005. For the initiative the Yunnan government established a functional network of HIV testing services in health facilities, which provided opportunities for integrating interventions targeted at other sexually transmitted diseases. In addition, introduction of point-of-care tests for syphilis in China allowed an expansion of syphilis testing in clinics and out-of-clinic settings, such as outreach services or sometimes pharmacies, in the province. Moreover, the central government issued a specific policy to ensure the availability of benzathine benzylpenicillin in health facilities for syphilis treatment. Supplies were ensured though advocacy efforts together with site supervision and monitoring.
Approach

After the three-by-one approach was proposed as the core technical strategy, the next step was to implement the strategy in the field. To do this, the Yunnan provincial department of health allocated public health funds for syphilis testing and treatment services.

Through a situation analysis, the local health facilities were mapped, evaluated for capacity and then categorized as sites for syphilis testing, diagnosis and treatment or sites for syphilis testing only. These were primary-care centres or community and township hospitals. A total of 363 sites across Yunnan province, including all the 130 antenatal clinics, were officially designated as testing, diagnosis and treatment sites by the provincial authority to ensure that each of 129 districts or counties had at least one such site. An additional 307 testing-only sites were established by equipping existing facilities with treponemal point-of-care test kits (immunochromatographic strips for finger-prick blood).

In 2012, 436 (81.0%) of the 538 sites in place could provide both treponemal testing (*Treponema pallidum* particle agglutination, enzyme immunoassay or immunochromatographic assay) and non-treponemal testing (toluidine red unheated serum test or rapid plasma reagin test). By 2015 the number of sites had increased to 670, of which 635 (94.8%) were equipped with both type of tests. Outreach teams from community-based organizations were also equipped to conduct point-of-care tests. The cost to patients of a syphilis test is normally 20 Chinese yuan or about 3 United States dollars (US$; 6.8 Chinese yuan = 1 US$ in 2017), but the programme provided testing free-of-charge in all the designated antenatal care settings.

To encourage people to seek syphilis screening, health promotion efforts were integrated into the ongoing HIV health education programme, via leaflets, posters and AIDS Day health promotion activities. An opt-out screening for syphilis was offered to people attending sexually transmitted disease clinics, voluntary counselling and testing sites, and methadone maintenance treatment clinics. For people testing positive at the designated testing, diagnosis and treatment sites, treatment was started immediately with intramuscular injection of benzathine benzylpenicillin 2.4 MU weekly for 2–3 weeks. For those testing positive at testing-only sites or at outreach services, staff gave patients a referral card with the address, telephone number and contact person at the nearest testing, diagnosis and treatment site where the diagnosis could be confirmed and treatment provided. Pregnant women were routinely screened for syphilis at their first visit to an antenatal clinic and treated for infection at the same clinic.
Training and re-training of local staff on how to perform point-of-care testing or on health promotion was a mandate of designated local centres for disease control. Approximately 4000 people annually were trained or re-trained in 1–2 day training courses at provincial, district and county levels. The trainers were disease control specialists, doctors, nurses and outreach paramedical workers.

To improve implementation of the testing, referral and treatment services, a pay-for-performance scheme was introduced in 2011. The scheme consisted of two mechanisms. The first was a purchase mechanism, by which public health subsidies were provided through an outsourcing contract to compensate sites for the services provided. Specifically, health-care providers at testing-only sites or outreach teams were paid 20 yuan for successful referral of a person positive for syphilis. Providers at testing, diagnosis and treatment sites were paid 20 yuan for treating a referred patient with the recommended regimen. The second mechanism was an assessment by the local health authority of the performance of the sites in delivering these services. Advice and recommendations were provided after the site assessment, and payment was made if performance met the requirements.

**Relevant changes**
The programme’s data collection and reporting system showed that over the period 2011–2015, a total of 394 643 attendees were tested for syphilis at voluntary counselling and testing centres and 89 497 at methadone maintenance treatment clinics. The proportion of persons tested for syphilis increased from 46.2% (32 877 out of 71 162 attendees) in 2010 to 98.2% (68 012/69 259) in 2015 at voluntary counselling and testing centres (Table 1 and Fig. 1). A similar increase was found among drug users attending methadone maintenance treatment clinics, from 53.4% (9836/18 419) in 2010 to 90.8% (17 921/19 737) in 2015. The coverage of testing in antenatal clinics increased from 81.6% (637 241/780 933) in 2011 to 99.7% (730 474/732 893) in 2015.

The percentage of syphilis-infected cases treated with benzathine benzylpenicillin according to the national guidelines increased from 26.6% (264/993) in 2010 to 82.5% (453/549) in 2015 in testing, diagnosis and treatment sites and from 68.6% (164/239) in 2011 to 97.1% (1320/1360) in 2015 in antenatal clinics (Table 1 and Fig. 2).

Data from sentinel surveillance indicated a decline in syphilis prevalence from 4.2% (252/6000) in 2012 to 3.4% (204/6000) in 2015 among male patients attending sexually transmitted disease clinics and from 2.1% (515/24 500) to 1.2% (269/22 400) among female sex workers.
The mean cost for the additional investment in pay-for-performance was around US$ 39 000 annually (range: US$ 35 000–70 000).

Lessons learnt
A specific effort in screening and treatment of syphilis in Yunnan has resulted in an increased uptake of syphilis testing and corresponding increase in treatment of infected cases. In addition to health promotion efforts which have been active for some time, two factors may have contributed to the increases. First, there was a province-wide HIV prevention and control programme in place in which the syphilis intervention services could be easily integrated to increase the uptake of syphilis testing. Second, the pay-for-performance scheme appeared to motivate health-care professionals to undertake syphilis intervention services.

The main lessons learnt are summarized in Box 1. Introduction of point-of-care tests for syphilis served as a facilitator for scaling-up of testing for syphilis, thereby creating a testing network covering 670 sites across Yunnan province. Furthermore, integrating syphilis testing into the existing services in government health facilities as well as the outreach services of community-based organizations resulted in an increased proportion of people tested and treated for syphilis. As one of these strategies, pay-for-performance has been widely implemented in many countries, with varying levels of success.

Despite the successes, several challenges remain. Although the costs are not high in relation to the provincial government budget for sexually transmitted disease control (more than US$ 2.5 million), the sustainability of local investments in pay-for-performance is a challenge. Treatment for chlamydia or other sexually transmitted infections did not benefit from the pay-for-performance scheme and may have been neglected. We therefore need to determine whether the benefits of introducing specific incentives for syphilis testing outweighed any potential adverse impact on other services. We also need to know whether implementation of pay-for-performance compromises the voluntary nature of testing.

In summary, introduction of financial incentives to providers could be linked to increased uptake of syphilis testing and treatment in the study area. These increases reinforce the need to collect further information on the feasibility, acceptability and cost–effectiveness of introducing pay-for-performance within the national or provincial health services and to translate evidence to policy for responding to the syphilis epidemic in China.
Acknowledgements

The authors thank all colleagues from the local centres for disease control at prefecture and county levels in Yunnan. We also appreciate the Institute of Dermatology, Chinese Academy of Medical Sciences & Peking Union Medical College where one of authors (Chen XS) is working with a research funding from the Chinese Academy Medical Sciences Initiative for Innovative Medicine (2016-I2M-3–021).

Funding:

The programme was financially supported by the Health and Family Planning Commission of Yunnan province.

Competing interests:

None declared.

References


Box 1. Summary of main lessons learnt

• Syphilis screening and treatment services were integrated into the existing human immunodeficiency virus programme as public health interventions in Yunnan province.

• Establishing a network of testing-only and testing, diagnosis and treatment sites across the province facilitated people’s access to syphilis screening and treatment services.

• Introduction and implementation of a pay-for-performance scheme appeared to motivate providers to increase the provision of syphilis testing, referral and treatment services.
### Table 1. Numbers of people tested and treated for syphilis at different access points in Yunnan province, China, 2010–2015

<table>
<thead>
<tr>
<th>Access point</th>
<th>No. of people</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
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<tbody>
<tr>
<td><strong>Tested for syphilis</strong></td>
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<td>Voluntary counselling and testing centres*a</td>
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<td>Attended clinic</td>
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<td><strong>Methadone maintenance treatment centres*a</strong></td>
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<td><strong>Antenatal clinics*a</strong></td>
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<td><strong>Treated for syphilis</strong></td>
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<tr>
<td>Testing, diagnosis and treatment centres*b</td>
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<tr>
<td>Confirmed positive</td>
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<td>993</td>
<td>N/A</td>
<td>N/A</td>
<td>1343</td>
<td>12976</td>
<td>549</td>
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<tr>
<td>Treated</td>
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<td>264</td>
<td>N/A</td>
<td>N/A</td>
<td>643</td>
<td>7786</td>
<td>453</td>
</tr>
<tr>
<td><strong>Antenatal clinics*a</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Confirmed positive</td>
<td></td>
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<td>239</td>
<td>690</td>
<td>1032</td>
<td>1338</td>
<td>1360</td>
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<tr>
<td>Treated</td>
<td></td>
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<td>164</td>
<td>586</td>
<td>957</td>
<td>1237</td>
<td>1320</td>
</tr>
</tbody>
</table>

N/A: data not available.

*a Data from routine reporting by clinics.

*b Data from ad hoc surveys by the provincial centre for disease control, except those for 2014 which used data from local surveys.

Notes: The national programme for prevention and control of syphilis in China was launched in 2010. Syphilis screening in antenatal clinics started in 2011 and was part of a separate programme. Syphilis-infected cases were treated with benzathine benzylpenicillin according to the national guidelines.11
Fig. 1. Percentage of people tested for syphilis at different access points in Yunnan province, China, 2010–2015

Notes: Numbers of people attending clinics and confirmed positive for syphilis are shown on Table 1. The national programme for prevention and control of syphilis in China was launched in 2010. Syphilis screening in antenatal clinics started in 2011 and was part of a separate programme.
Fig. 2. Percentage of people treated for syphilis at different access points in Yunnan province, China, 2010–2015

Notes: Numbers of people treated for syphilis are shown on Table 1. The national programme for prevention and control of syphilis in China was launched in 2010. Data from testing, diagnosis and treatment sites were unavailable for 2011 and 2012. Syphilis screening in antenatal clinics started in 2011 and was part of a separate programme. Syphilis-infected cases were treated with benzathine benzylpenicillin according to the national guidelines.\textsuperscript{11}