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Brief Report

Optimizing Interprofessional Syphilis Care Through a Digital Decision Tool

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Abstract

Syphilis incidence has increased globally in recent years, affecting populations historically considered at lower risk, including heterosexual women. The clinical and serological complexity of syphilis presents important challenges for frontline clinicians, particularly in primary care and nurse-led sexual health settings. In increasingly interprofessional care environments, where nurses, physicians, pharmacists, and other health professionals share responsibilities for screening and treatment, standardized decision-making support is essential. To address these needs, we developed an open-access electronic clinical decision support tool specifically designed to assist clinicians in the evaluation, staging, and management of suspected or confirmed syphilis at the point of care. Built from current evidence-based guidelines, the tool translates existing recommendations into an interactive algorithm aligned with real-world clinical reasoning. This article describes the clinical context that motivated the tool's development, its structure, and its potential role in supporting standardized, evidence-based care across diverse interprofessional clinical settings.

Keywords: sexually transmitted infections; syphilis; digital

1. Introduction

Syphilis has re-emerged as a significant public health concern worldwide. Increasing incidence has been reported across multiple regions, including among populations historically less affected by the infection, such as heterosexual women [1]. As epidemiological patterns evolve, frontline clinicians must remain vigilant for a wide spectrum of clinical presentations.

Syphilis has long been described as “the great imitator,” reflecting its highly variable manifestations. Diagnosis and management are further complicated by the interpretation of serological testing, which does not follow a simple “detection” logic as is seen in other sexually transmitted infections such as chlamydia or gonorrhea. Accurate assessment requires integration of clinical presentation, prior treatment history, previous serological results, and individual patient context.

These complexities create important challenges for clinicians, particularly within interprofessional teams where providers may have differing levels of experience, scopes of practice, and familiarity with syphilis staging.

2. Challenges in Current Clinical Practice

Given the complexity and possibility for false-positives with serologic testing [2–4], syphilis may be underdiagnosed, misclassified, or incompletely managed in clinical practice. Reported challenges include diagnostic uncertainty, delays in treatment initiation, and incomplete preventive interventions such as partner notification and follow-up.

These challenges are particularly relevant in modern healthcare systems where many sexual health services are delivered in nurse-led clinics or interdisciplinary primary care environments. In

Canada and elsewhere, expanding professional scopes of practice now allow a broader range of healthcare professionals to diagnose infections and initiate treatment. While this evolution improves access to care, it also highlights the need for accessible tools that support clinical decision-making for all health professionals.

3. Rationale for Tool Development

Existing clinical tools [5–7] typically present syphilis evaluation and management using tables summarizing serological patterns and associated diagnoses. Although comprehensive, these formats do not always reflect how clinicians approach real clinical encounters.

Clinicians generally reason algorithmically by starting from the patient's presentation and progressively integrating laboratory results and clinical history. Within team-based care settings, this reasoning process must also be coherent across disciplines to ensure consistent assessment and follow-up. However, available resources rarely guide users step-by-step from their clinical starting point toward diagnosis and management decisions.

This mismatch may contribute to uncertainty, delays in care, diagnostic errors, undertreatment leading to continued transmission, or overtreatment. In some cases, misinterpretation of screening assays may result in erroneous diagnoses, generating unnecessary anxiety and social consequences for patients.

In our clinical setting, less experienced clinicians frequently sought specialist consultation to assist with syphilis staging and management decisions. These consultations often followed a predictable sequence of structured clinical questions, suggesting that this reasoning process could potentially be translated into a standardized decision-support approach available directly at the point of care. Moreover, a tool accessible to an entire interprofessional team promotes shared understanding and reduces variability between care providers.

To address these gaps, we developed an electronic clinical decision support tool aimed at facilitating syphilis evaluation and management in frontline practice and supporting harmonized decision-making across interdisciplinary teams.

4. Description of the Electronic Decision Support Tool

The online tool is a freely accessible web-based platform designed for use at the point of care without registration or licensing requirements. Its objective is to support but not replace clinical judgment. It was intentionally designed to be usable by a variety of health professionals, from nurses and physicians to pharmacists and public health practitioners, reflecting contemporary interprofessional practice models.

Development of the tool was based on current evidence, including Québec's Institut national d'excellence en santé et en services sociaux (INESSS) sexually transmitted infection guidelines who conducted a thorough literature review to create simplified user's guide [5] and recent review articles published in renowned peer-reviewed journals [6,7].

The tool converts guideline recommendations into an interactive clinical algorithm: users are guided through sequential questions beginning with whether the patient is symptomatic or asymptomatic (Figure 1). The algorithm then integrates clinical presentation, current serological results, prior testing history and treatment history.

1

Does the person have symptoms suggestive of syphilis?

☐ Yes

☒ No

2

What is the result of the EIA test?

The EIA test is a treponemal test and is generally reported as either positive or negative.
For individuals who have previously had syphilis, the laboratory may report the result as "Known."

☒ Reactive

☐ Negative

3

Has the person ever been diagnosed with syphilis in the past?

☐ Yes

☐ No

Figure 1. Screenshot of a sample question presented to the user.

Based on these inputs, the tool proposes the most probable diagnostic interpretation and highlights key management steps, including recommended antibiotic treatment, partner management considerations, public health reporting, indications for HIV pre-exposure prophylaxis assessment when relevant, and recommended serological follow-up to confirm treatment response (Figure 2).

3

Suspected secondary syphilis

1. Treatment: Administer a single dose of 2.4 million units of benzathine penicillin G (Bicillin L-A) by intramuscular injection (1.2 million units per buttock) diluted in xylocaine, and apply code K on the prescription to ensure free treatment.

2. Preventive intervention for partners (IPPAP): The period to cover for IPPAP in secondary syphilis is 6 months before the onset of symptoms (or 8 months before the date of the test if the symptom onset date is unknown).

3. Serological follow-up (RPR): Plan RPR follow-up at 3, 6, and 12 months after treatment. A fourfold decrease in titer (two dilutions, e.g., from 1:32 to 1:8) is expected after 6 to 12 months.

4. Rule out neurosyphilis: Be vigilant about the possibility of neuromeningeal involvement. If there is any doubt, consult an experienced colleague.

5. Mandatory reporting: Report syphilis to public health according to local recommendations (mandatory reportable disease in some jurisdictions).

Don't forget :

HIV and STI screening: If not already done, offer HIV and other STI testing (co-infections are common).

Consider Pre-Exposure Prophylaxis (PrEP).

Consider doxy-PEP

Figure 2. Screenshot displaying an example of the generated diagnosis and associated recommendations.

5. Implementation

The tool was initially developed to respond to local clinical needs but rapidly demonstrated broader applicability. It has been adopted in both nurse-led clinics and physician-based primary care settings. Early informal feedback from users has been positive, particularly regarding improved confidence in staging and management decisions and reduced reliance on ad hoc specialist consultation.

Beyond decision support, repeated use of the tool may reinforce clinicians’ understanding of the reasoning process underlying syphilis evaluation, functioning simultaneously as an educational resource for all members of the care team.



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This initiative illustrates how collaborative clinical problem-solving can lead to scalable innovations that standardize care and promote adherence to best practices.

Electronic decision support tools may play an important role in democratizing access to specialized clinical knowledge, particularly in settings where expertise in sexual health is variable. By translating complex guidelines into clinically intuitive workflows, such tools have the potential to reduce diagnostic variability, improve treatment timeliness, and support prevention efforts.

Future directions include formal evaluation of clinical impact, broader dissemination, and translation into additional languages to facilitate international use. Collaboration with interested partners is welcomed to expand accessibility. Engaging interprofessional partners in these next steps may further enhance the tool's relevance and uptake.

6. Discussion

The complexity of syphilis diagnosis and management in evolving healthcare environments underscores the need for practical clinical support tools. An open-access electronic decision support tool may help standardize evaluation, support frontline clinicians, and improve adherence to evidence-based management while strengthening clinical reasoning across diverse interprofessional practice settings.

This work represents a practical example of how identified clinical needs can drive collaborative innovation aimed at improving quality of care across diverse practice settings.

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