



**Karolinska  
Institutet**

**Institutionen för Lärande, Informatik, Management och Etik**

## **Evidence-Based Decision Support in HIV/TB Care**

*Designing treatment, monitoring, and assessment support  
for care providers*

**AKADEMISK AVHANDLING**

som för avläggande av medicine doktorexamen vid Karolinska  
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**Carolina Wannheden**

M.Sc.

*Huvudhandledare:*

Dr. Helena Hvitfeldt Forsberg  
Karolinska Institutet  
Institutionen för lärande, informatik,  
management och etik (LIME)  
Medical Management Centre (MMC)

*Bihandledare:*

Dr. Johan Ellenius  
Karolinska Institutet, LIME, MMC och  
Uppsala Monitoring Centre, WHO collaboration  
centre for international drug monitoring

Docent Katarina Westling  
Karolinska Institutet  
Institutionen för medicin, Huddinge  
Infektionssjukdomar och hud

Professor Christer Sandahl  
Karolinska Institutet  
LIME, MMC

*Fakultetsopponent:*

Professor Minna Kaila  
University of Helsinki  
Faculty of Medicine, Hjelt Institute

*Betygsnämnd:*

Professor Anna Ehrenberg  
Högskolan Dalarna  
Akademin utbildning, hälsa och samhälle

Professor Patrik Eklund  
Umeå Universitet  
Institutionen för datavetenskap

Docent Carl Johan Treutiger  
Karolinska Institutet  
Institutionen för medicin, Huddinge  
Centrum för infektionsmedicin

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# ABSTRACT

**Introduction:** HIV and tuberculosis (TB) coinfection, which is a major challenge for healthcare systems worldwide, requires effective strategies to support care providers in applying best clinical evidence in making treatment decisions about the care of individual patients. Clinical decision support (CDS) systems have the potential to facilitate the implementation of evidence-based guidelines in clinical practice.

**Aim:** The aim of this thesis was to explore how a CDS system could be designed to support the adoption of evidence-based guidelines in the treatment of HIV-related TB.

**Study design:** The HIV outpatient clinic at the Karolinska University Hospital, Huddinge, Stockholm, was the setting for a user-centered design approach structured in three phases: contextual analysis (Studies I and II), design (Study III), and evaluation (Study IV). Study I explores care providers' challenges and requirements; Study II, which describes socio-demographic and clinical characteristics of patients in this setting, analyzes the factors associated with anti-TB treatment success as well as adverse drug reactions; Study III proposes a CDS framework of drug therapy recommendations that is applied to HIV-related TB treatment guidelines; Study IV formatively evaluates the conceptual design of a CDS prototype that is based on the framework developed in Study III.

**Methods:** In Study I, the contextual analysis is based on observations and interviews. Study II analyses patient treatment outcomes in the research setting between the years 1987 to 2010 (inclusive). Study III presents the design that is based on prototyping and guideline modeling. Study IV uses focus groups of physicians and nurses in the evaluation of the design.

**Results:** The contextual analysis revealed challenges related to the complexity of HIV-related TB treatment (Studies I and II). Because the care providers thought they lacked sufficient experience with HIV/TB drug therapy, they sought improved support tools and structures (Study I). Combined HIV and TB treatment was related to treatment success, but was also associated with adverse drug reactions (Study II). The design phase applied the eviTMA (evidence-based Treatment, Monitoring, and Assessment) framework to model HIV-related TB treatment guidelines. This resulted in a CDS prototype that models alternative drug therapy options, their expected effects, and recommended monitoring routines (Study III). The care providers identified several potential benefits of the eviTMA CDS prototype including support for decision making, collaboration, and quality improvement work (Study IV). Identified concerns that need to be addressed in future include the risk of overdependence on CDS, increased workload, and aspects related to the implementation and maintenance of a CDS system (Study IV).

**Conclusions:** The main contribution of this thesis is the eviTMA CDS framework designed to support care providers in the adoption of evidence-based drug therapy recommendations. The framework was evaluated in a CDS prototype for HIV-related TB treatment. Application to other conditions was desired by care providers and should be explored in future.