

CDSS: FINAL PROJECT

Approach to the Patient with Genital Ulcers

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L1

Introduction

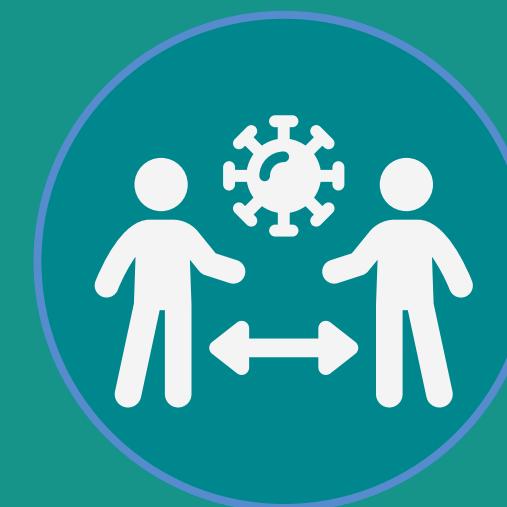
Infectious genital ulcers are a major health concern. Genital ulcer disease (GUD) can lead to complications in a patient's life. GUD is often misdiagnosed in up to 50% of cases.

GUD - CDSS Main Goals

Prevent complications
and reinfection

Reduce transmission
rates

Provide diagnostic guide
and early treatment



Complications of Untreated GUD:

Increased risk of HIV transmission

Infertility and sexual dysfunction

Secondary bacterial infections

Transmission to sexual partners or
during pregnancy

Systemic complications

Guideline Selection



World Health Organization

Both guidelines provide a comprehensive guidance to efficiently manage:

Herpes (HSV-1, HSV-2), Syphilis (*T. pallidum*), Lymphogranuloma Venereum (*C. trachomatis*), Chancroid (*H. ducreyi*) and Granuloma Inguinale (*K. granulomatis*).

Both evidence-based resources offer diagnosis test and treatment protocols which make it ideal for treating patients even in resource limited settings.

USER PERSONAS



Name: Smith M.D

Profession: physician at sexual health clinic

Pain Points:

- limited time for each patient
- waiting for lab results -> Delays and potentially more STI transmission



Name: Dr. Ndiritu

Profession: physician at a rural health clinic

Pain Points:

- patients have limited budget
- limited medical supplies
- lack of advanced diagnostic tools and medical facilities

USER SCENARIOS



Case 1: Dr. Smith

John presents with painful genital sores. John has had multiple sexual partners over the past few months, including both men and women.

1. Initial Consultation:

- detailed sexual history is registered
- physical examination -> number and characteristic of ulcers is noted

2. Diagnostic Testing:

- tests for common STIs ordered including herpes simplex virus (HSV), syphilis, and HIV.
- App also suggests testing for chlamydia
- Dr Smith suspects HSV based on appearance

3. Empiric treatment

- treatment for HSV -> dosage suggested by app

4. Follow Up

- John returns with improved symptoms -> HSV diagnosis confirmed
- The other tests are negative



Case 2: Dr. Ndiritu

A 19-year-old woman named Amina presents with genital sores. Access to advanced diagnostic tools and rapid tests is limited.

1. Initial Consultation:

- Dr. Ndiritu listens to Amina's symptoms and takes sexual history.
- physical examination -> multiple ulcers and inguinal lymphadenopathy

2. Diagnostic Testing:

- suspicion of chancroid or LGV -> App used for decision support
- App suggests rapid syphilis test -> negative
- App also suggests LGV test

3. Empiric treatment

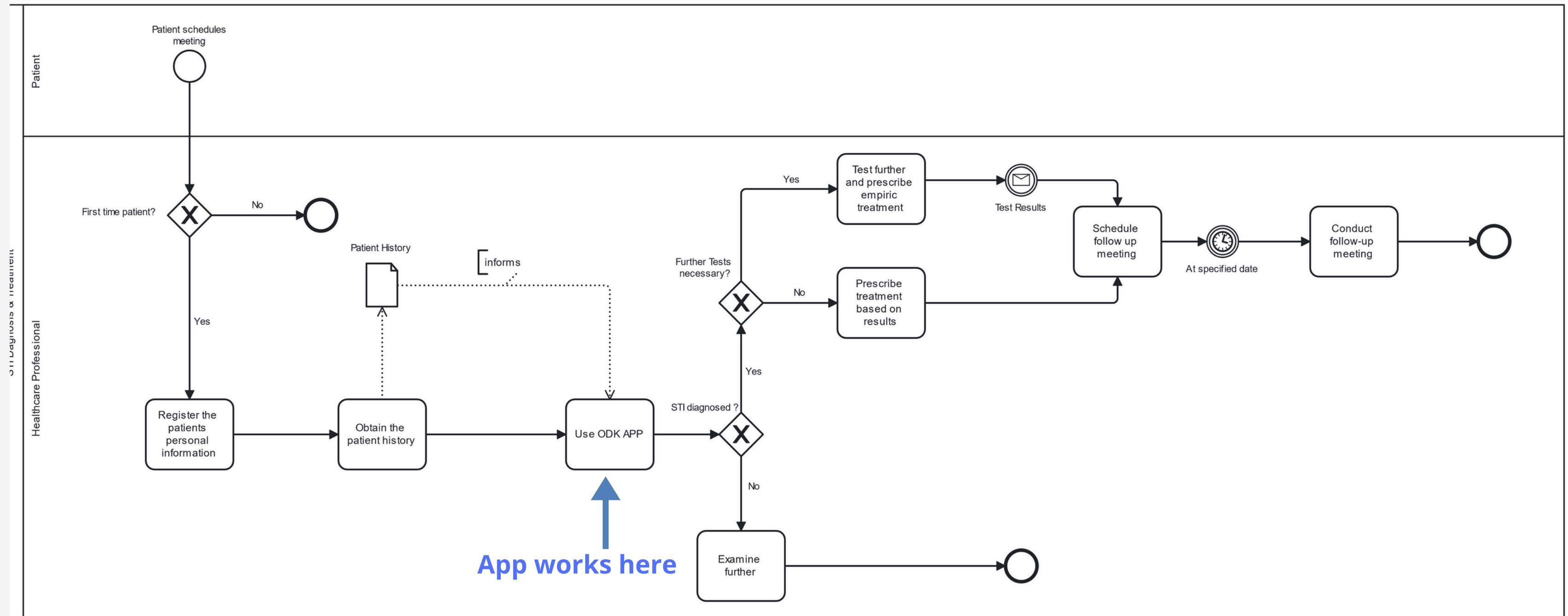
- treatment for LGV with doxycycline

4. Follow Up

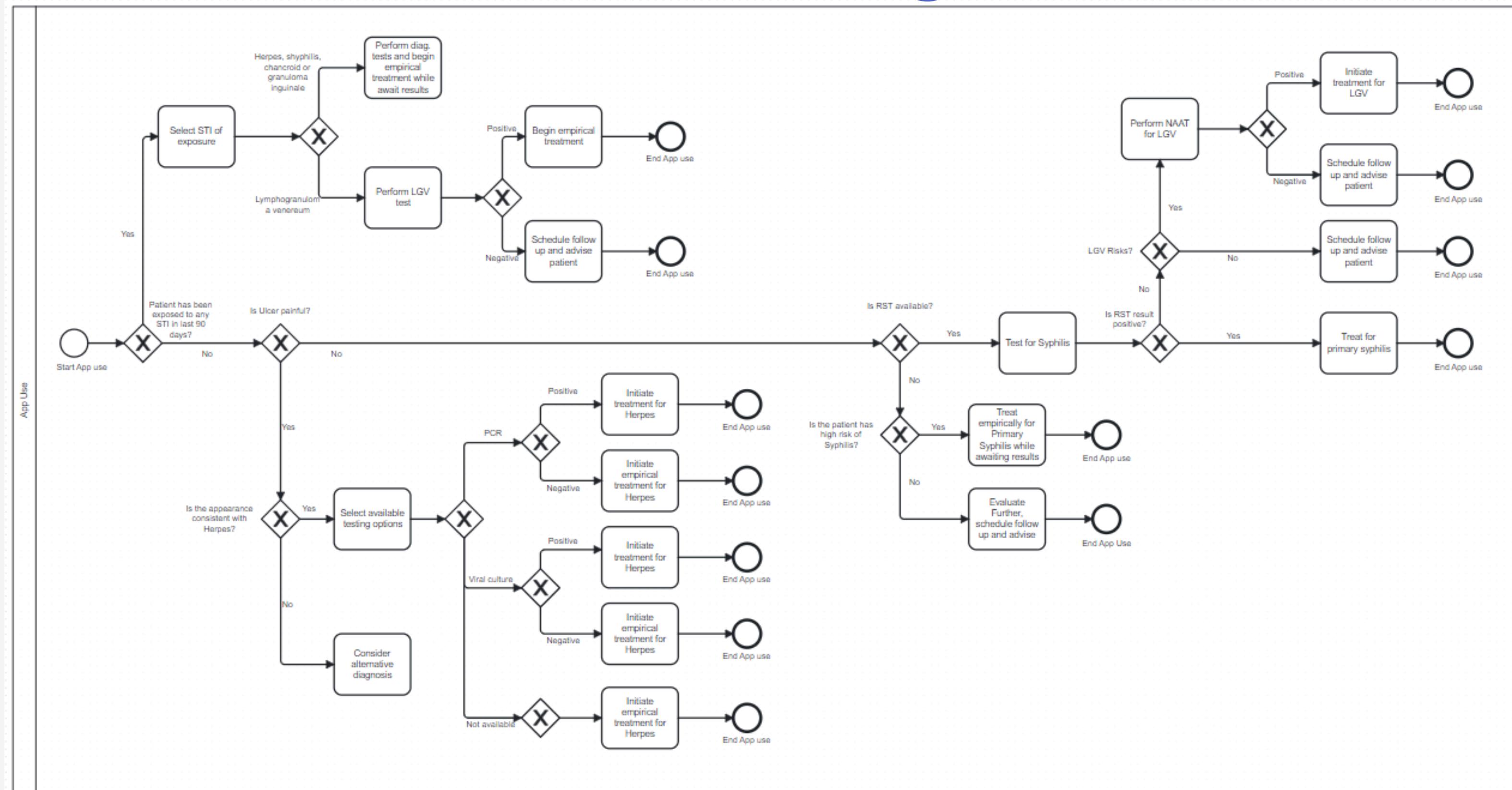
- Amina returns with improved results
- Diagnostic tests confirm initial diagnosis

L2

High level Process



Decision Logic



Note: better viewed on Camunda

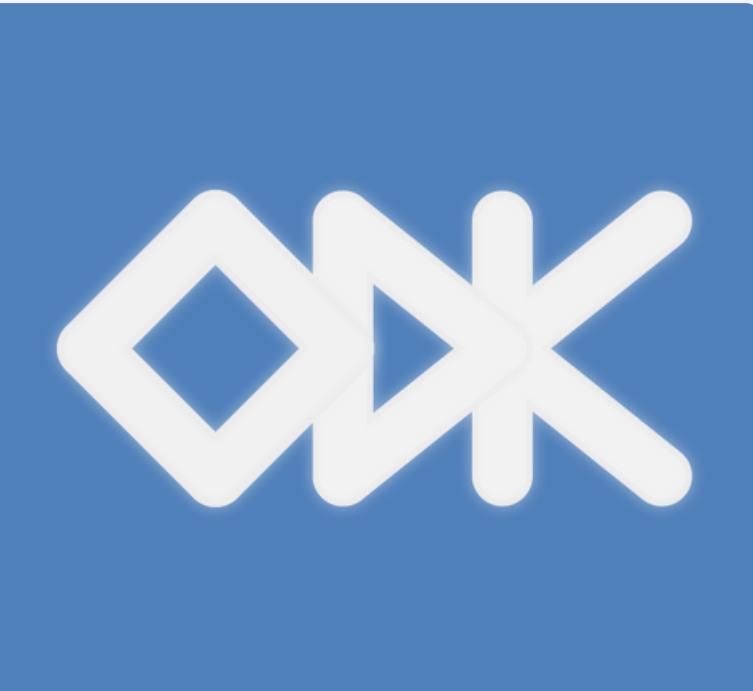
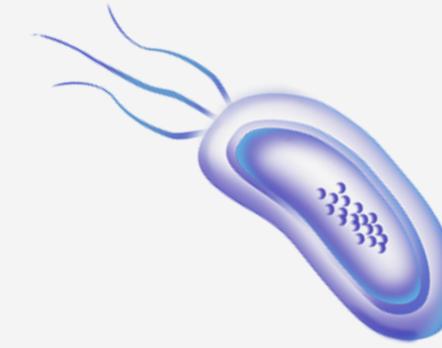
Challenges in Translation (L1-L2)



1. Addressing resource constraints.
2. Implementation of visual and information aids to help users compare.
3. Addition of diagnostic test confirmation availability prior to LGV empiric treatment.
4. Implementation of a patient selection process before the first consultation.
5. Focusing on the five most common STIs causing GUD.
6. Determining the context and user for the app.
7. Consideration of testing method availability.
8. Integration of the app into a realistic medical process, including modeling a typical first patient.

L3 / L4

Machine Readable Code and Deployment



The **BPMN** guides the physician to collect personal data, patient history and risk factors to determine if the patient is candidate for the initial assessment of genital ulcers.

ODK (open data kit) offers templates to create forms that work offline, once a connection to a server is available the data is collected.

xlsx Form - Leads the user in a process that in order to initiate treatment they have to confirm - symptoms, clinical appearance, and available diagnostic tests. After the treatment is given, relevant follow up recommendations are given.



Allows for online and offline access

Supported devices: mobile phone, tablets, personal computers

Allows for secure patient data storage (GDPR, HIPPA compliant)



DEMO



SCAN HERE

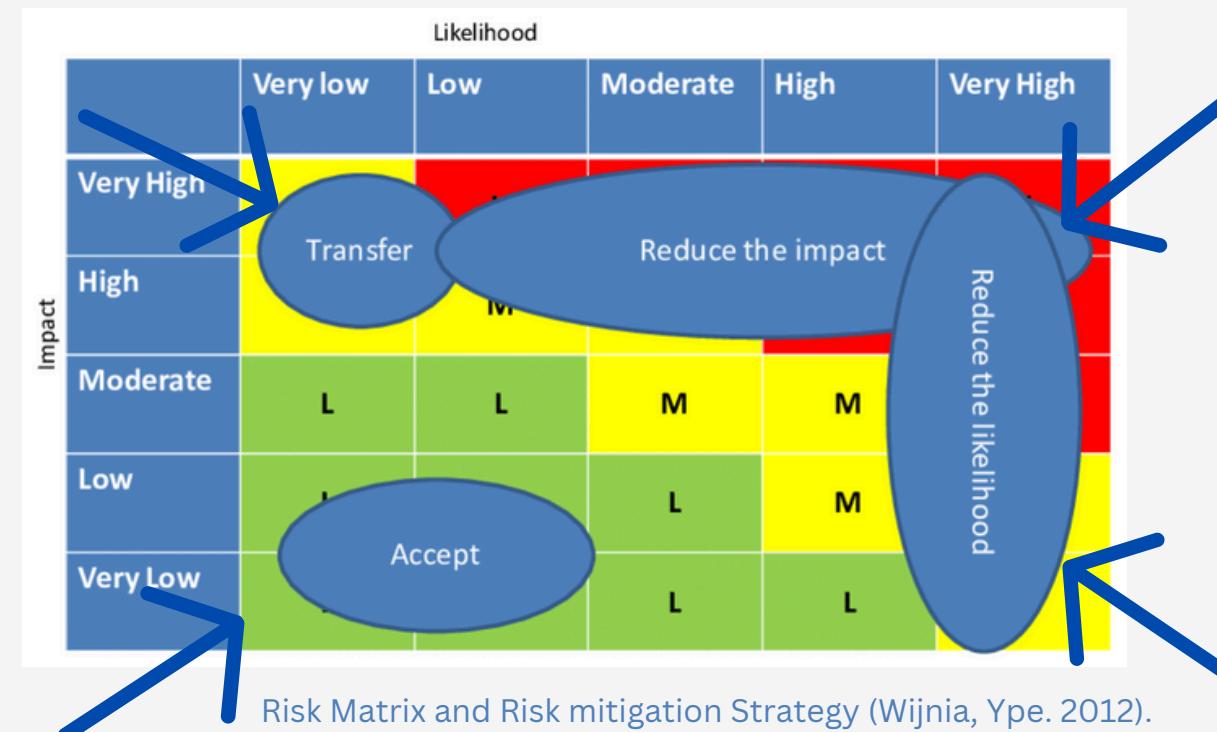
Risk-Based Testing Approach for the Application

Security Risks

Due to their high impact despite low likelihood, these risks will be transferred through insurance or by using platforms that guarantee application security.

Business Risks

These will be accepted as their impact is relatively low.



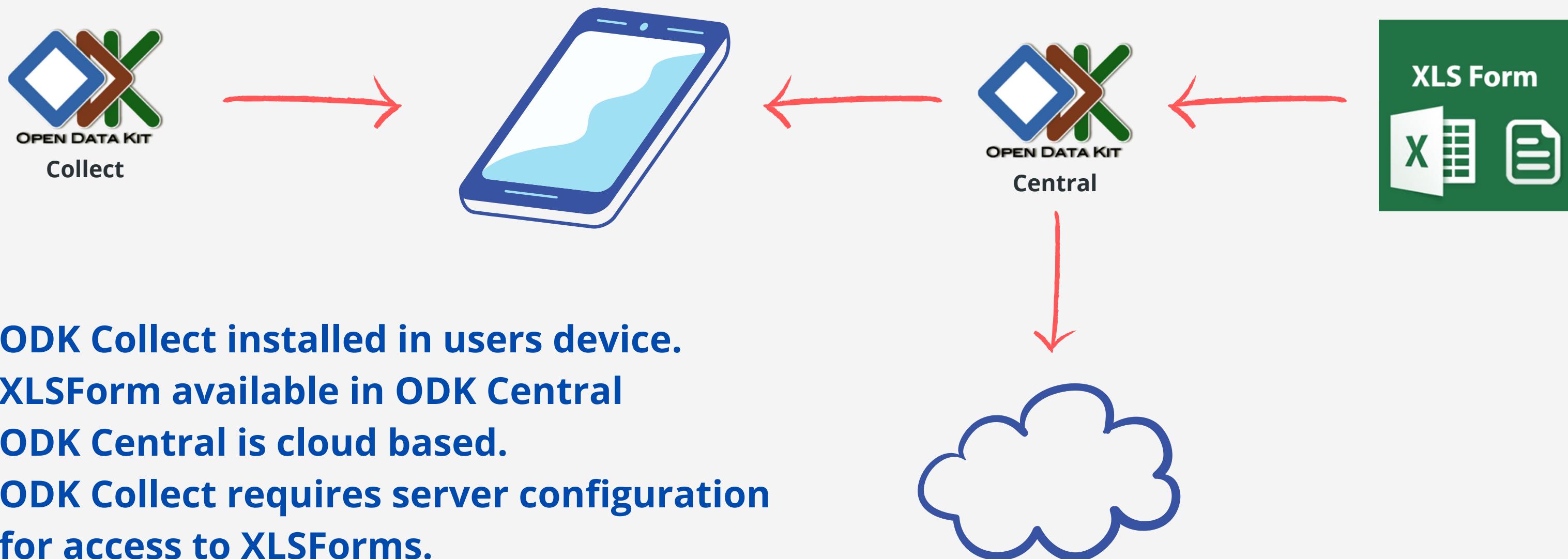
Clinical Risks, Technical Risks, UX/UI Risks, and Regulation Risks

Given their potential to cause critical problems, these risks will receive the highest priority in testing and mitigation efforts depends on stage of development.

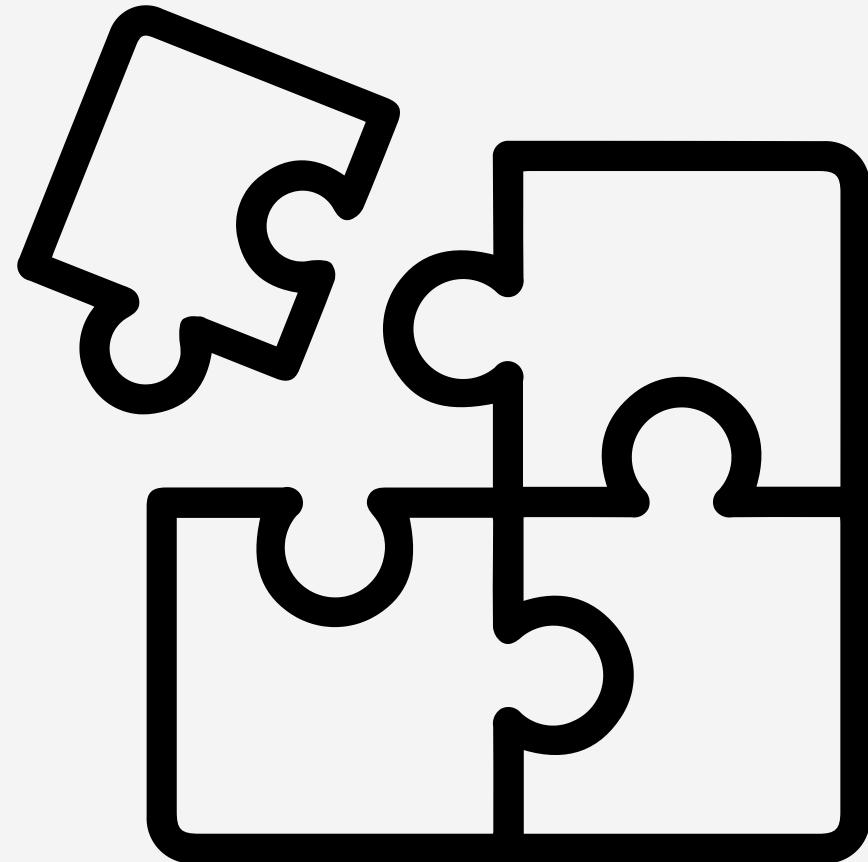
Exploitation Support Risks

The Aim is to reduce the frequency of potential problems in this area.

Implementation, monitoring and evaluation



Expected Impact



Evidence based (in guidelines) treatment decision support

Focus on medical doctors in early stages of training to help them gain confidence

Sample images of the ulcers will improve visual recognition

TEAM: LEARNINGS AND CONTRIBUTIONS



Alberto Wicker

L1: Guidelines, Healthcare Need
L3 / L4: ODK, Streamlit App

Learnings and Challenges:
“I realized that it is a big challenge to translate medical text into a functional, user friendly App that adds value to the daily practice of a healthcare professional. Learning the use of new tools is essential to make CDSS fit for use.”



Gerardo Romeny

L2: Decision Logic BPMN, monitoring / evaluation, and impact

Learnings and Challenges:
“This project helped clarify the difference between each stage L1 to L4. Challenge was to understand the exact difference between some topics, for example between decision logic and high level BPMN.”



Erzhena Batorova

L1: User Personas / Scenarios
Quality assurance / Testing

Learnings and Challenges:

“”



Janick Marti

L2 High Level BPMN Proces flow
L4 testing of the app

Learnings and Challenges:
Translating the guidelines and information into a usable and logic process proved challenging. I realized that its not just about the structure of the app, but also who is going to use it in what context, and for what situation is it useful.

THANK YOU

