1. Introduction

The web3 solution BlockMed is a Proof Of Concept designed to model the prescription and dispensing of medications. It implements the W3C's Self-Sovereign Identity (SSI) paradigm, using Decentralized Identifiers (DID) and Verifiable Credentials (VC) to ensure the authenticity, privacy, and security of interactions between the system's actors: Patients, Doctors, Pharmacies, and Health Insurance Providers (HIP).

A Decentralized Identifier is a new type of identifier that enables verifiable, self-sufficient, and decentralized identity. DIDs are designed to allow entities such as individuals, organizations, devices, and other agents to have an autonomous digital identity that does not depend on any centralized authority.

This document describes in detail the use cases developed for the mentioned solution. These practical scenarios help identify and resolve possible challenges, ensuring that the system meets the needs of the involved actors.

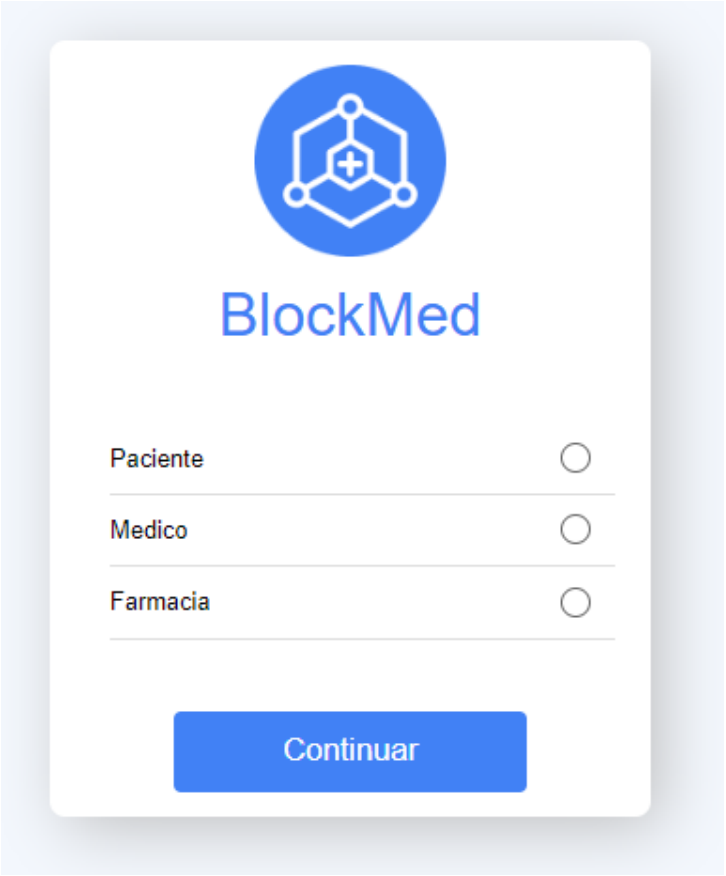
2. Use Cases for Creating Patient, Doctor, and Pharmacy Users

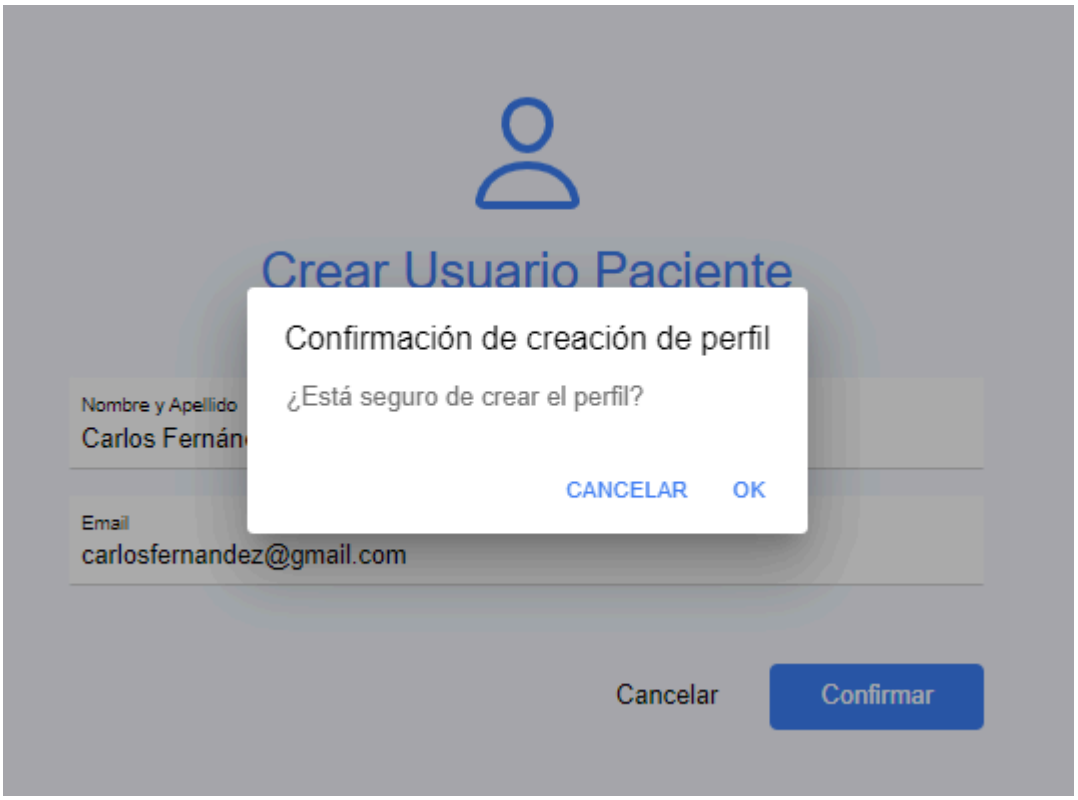
This section will describe the necessary steps for creating the relevant users: Patient, Doctor, and Pharmacy.

The data of the mentioned actors will be stored in a distributed manner in each of their Wallets, which will be installed on their mobile devices or computers.

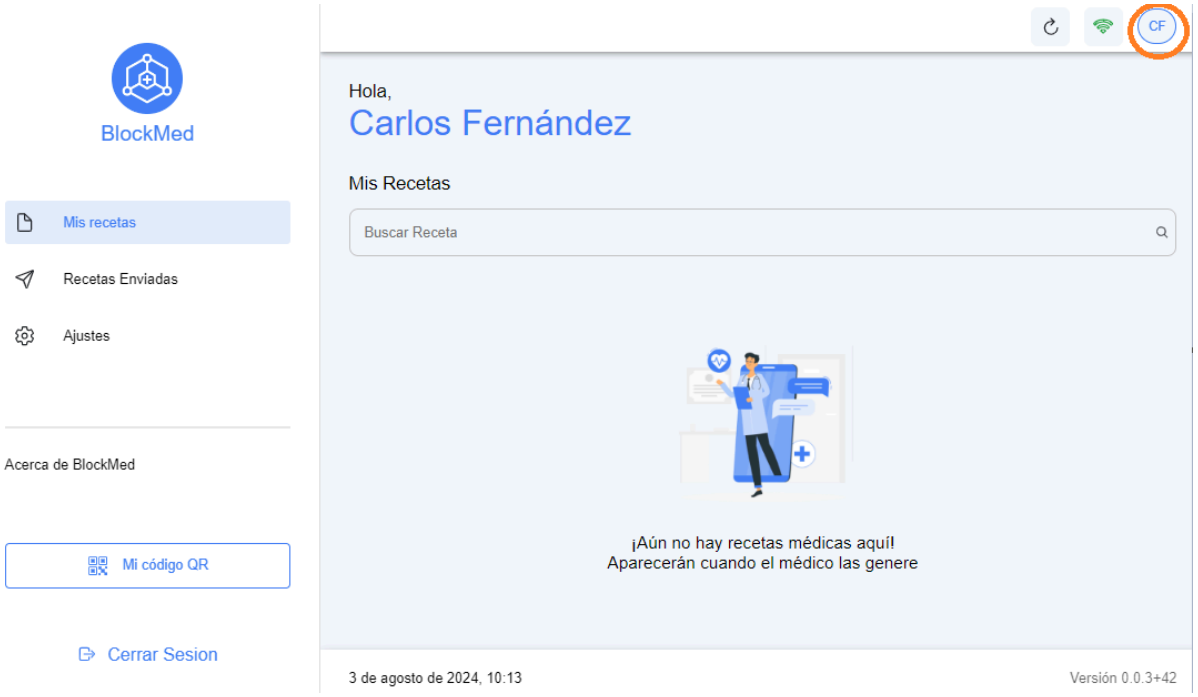
2.1. Patient Registration

From the home screen at the URL https://app.recetasbc.com.ar, select the Patient option, and fill in the fields for First Name, Last Name, and Email.

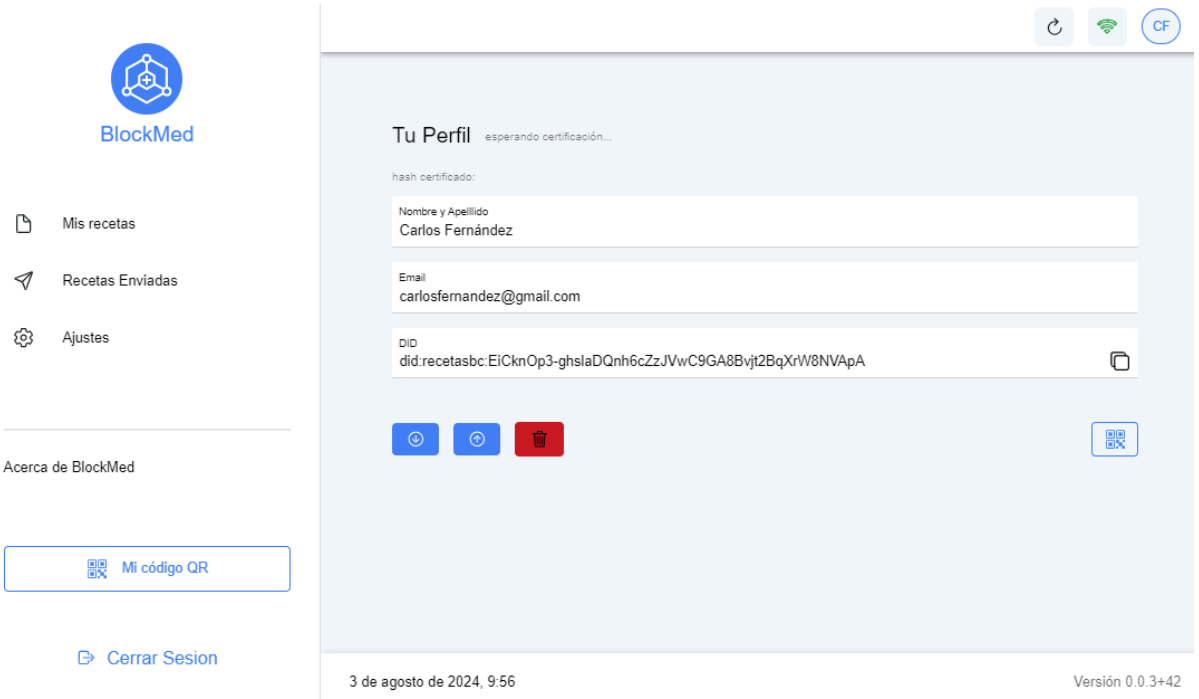




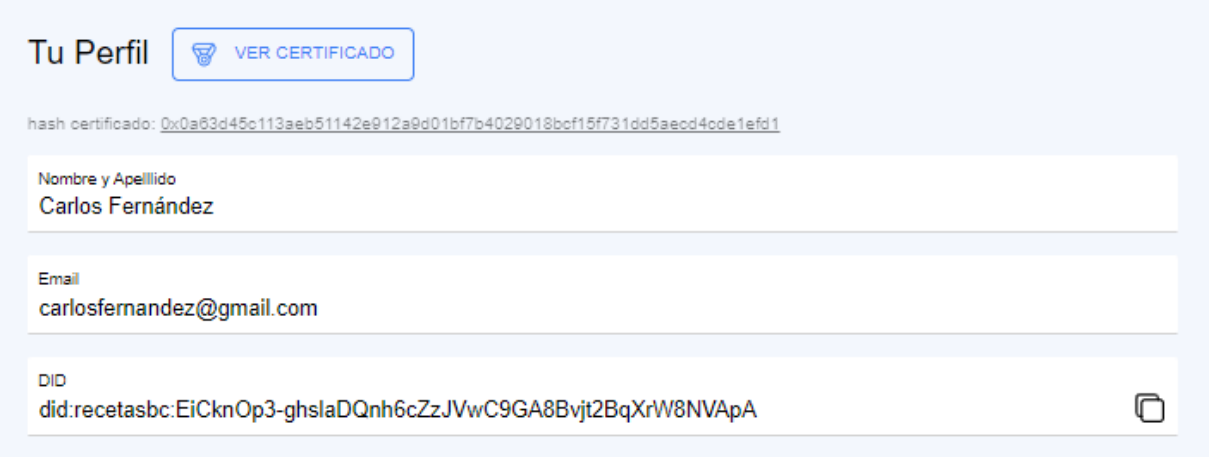
As the profile creation progresses, the Patient's Wallet opens, with the available functionalities that will be reviewed later in the Use Case for creating and consuming Prescriptions. On the left menu, the buttons for My Prescriptions and Sent Prescriptions are displayed, allowing you to view the prescriptions according to their statuses.



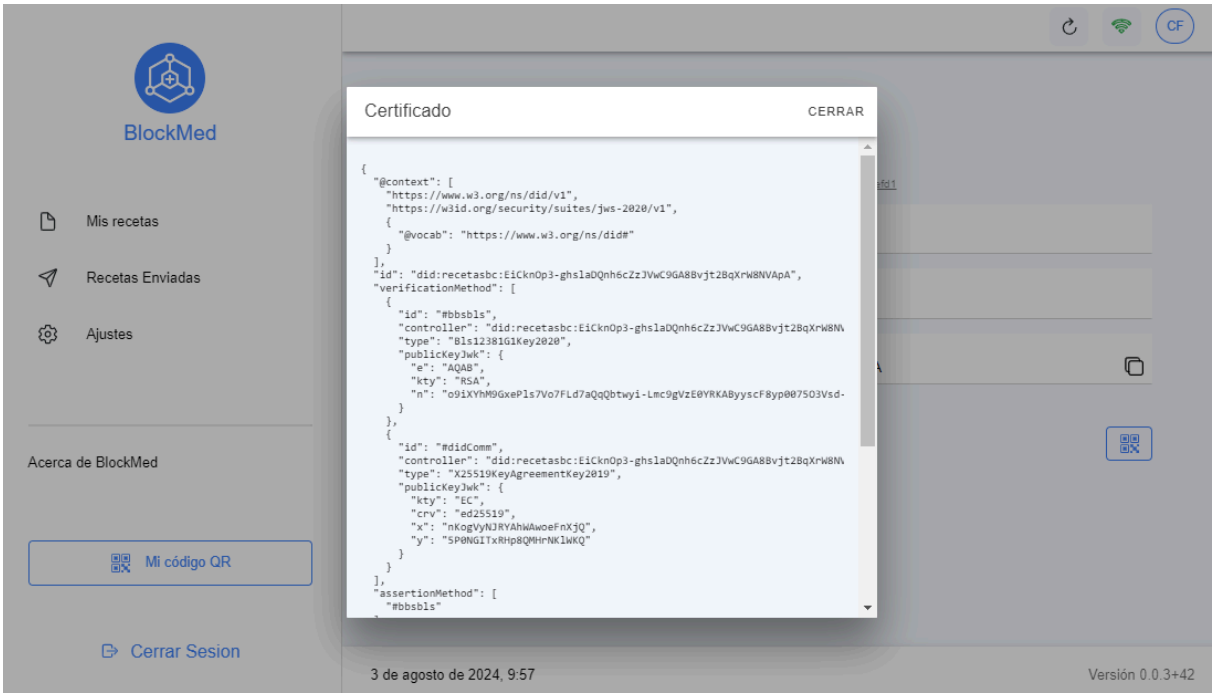
By clicking the button with the initials of the name, indicated on the previous screen, you can access the patient's profile, displaying their First and Last Name, Email, and the generated DID, which is their unique identifier in the system. You can also see the QR code button that identifies the patient.



Initially, you will see the message "Waiting for certification...", indicating that the DID has been generated but certification is not yet complete. Seconds or minutes later, you will be able to see the button to view the certificate and the hash with which it was recorded on the blockchain.

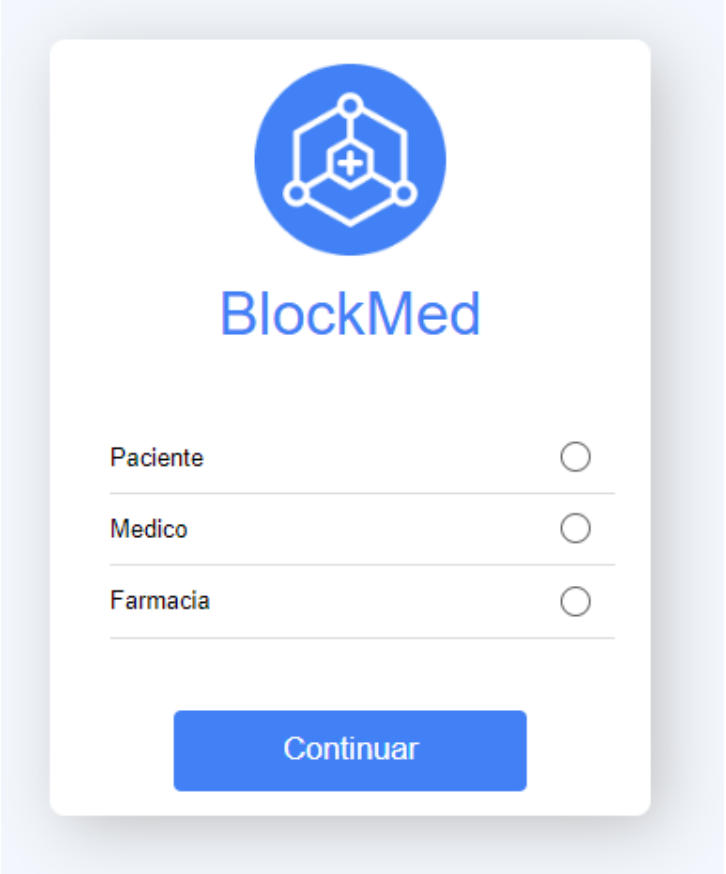


The View Certificate button allows you to open the details of the information contained in the generated certificate.

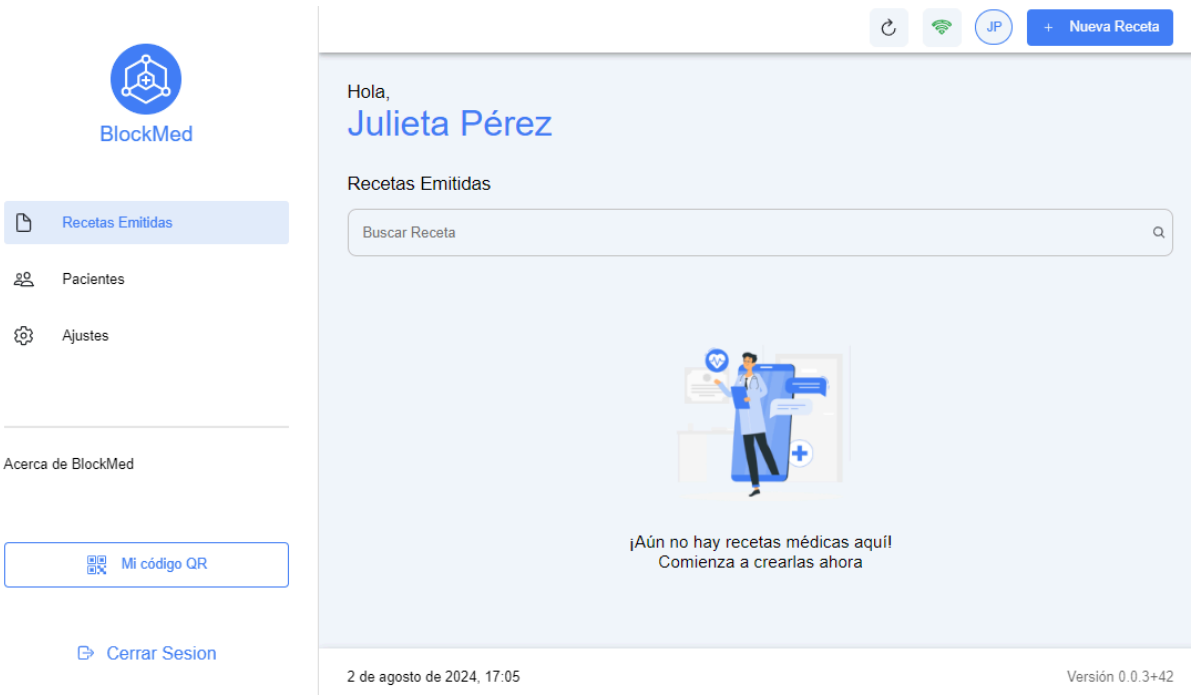


2.2. Doctor Registration

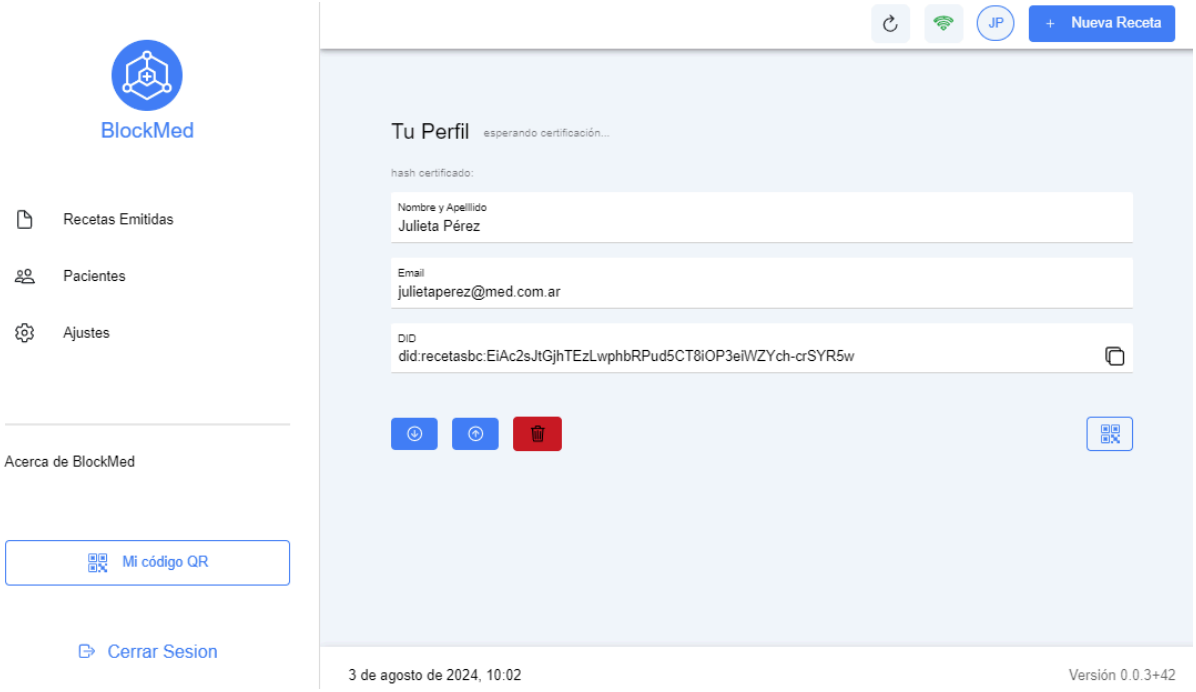
From the home screen at the URL https://app.recetasbc.com.ar, select the Patient option, and fill in the fields for First Name, Last Name, and Email.



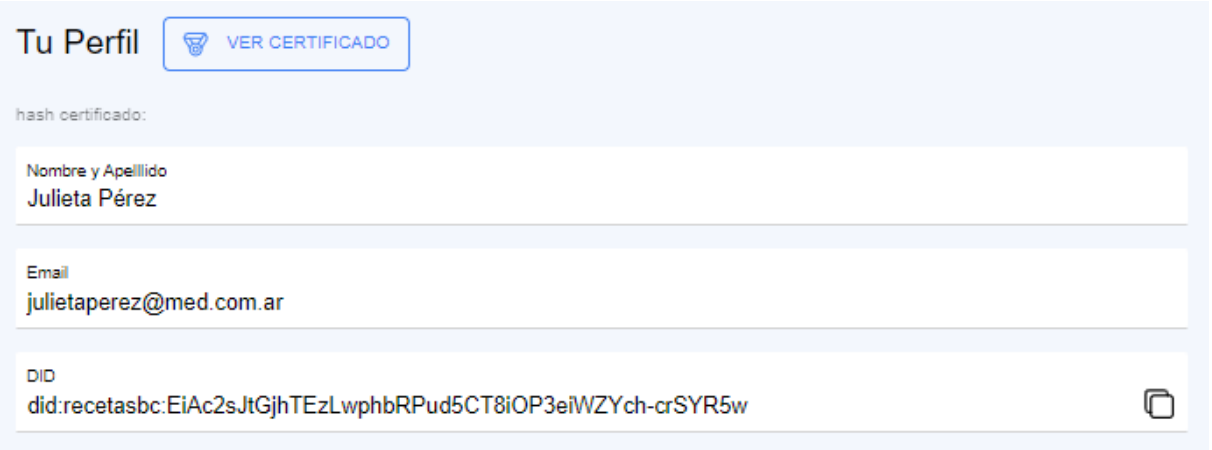
As you proceed with creating the profile, the doctor's wallet opens, with available functionalities that will be reviewed later in the Prescription Creation and Consumption Use Case. Unlike the patient profile, you will see the New Prescription button, as well as the Issued Prescriptions and Patients buttons in the left menu.



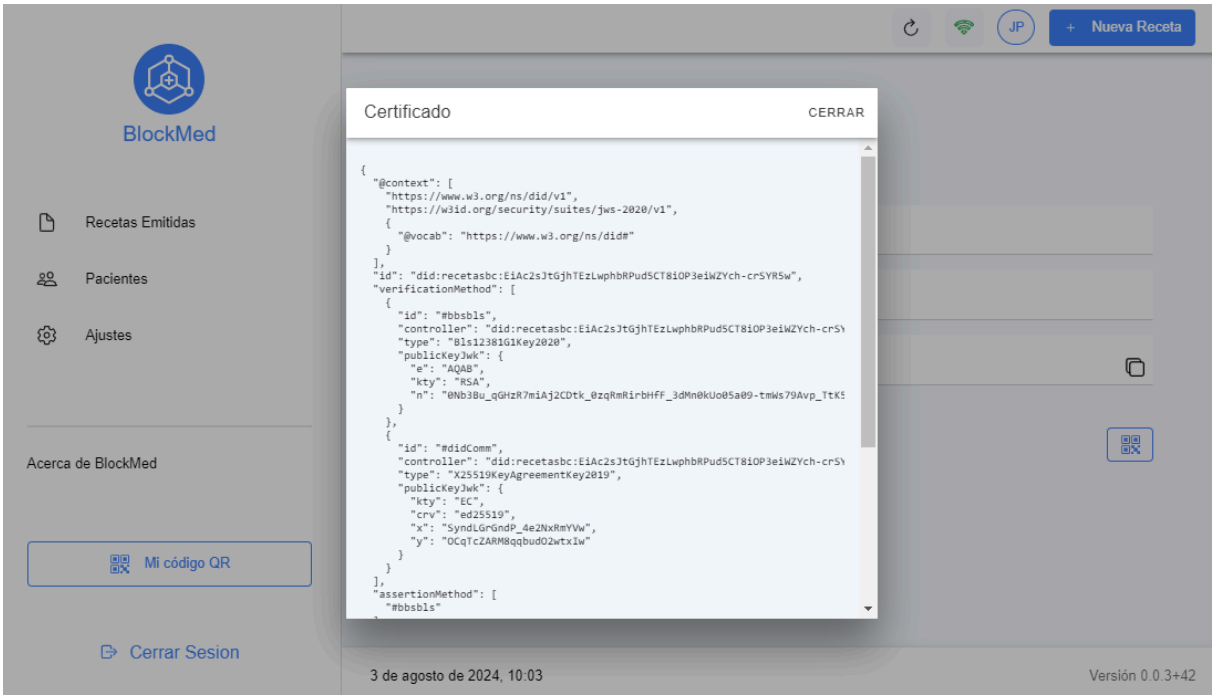
By clicking the button with the initials of the name, as shown on the next screen, you can access the doctor's profile, displaying their First and Last Name, Email, and the generated DID, which is their unique identifier in the system. You can also see the QR code button that identifies the doctor.



As indicated in the patient creation case, you will see the message "Waiting for certification...", indicating that the DID has been generated but certification has not yet been completed. Seconds or minutes later, you will be able to see the button to view the certificate and the hash with which it was recorded on the blockchain.

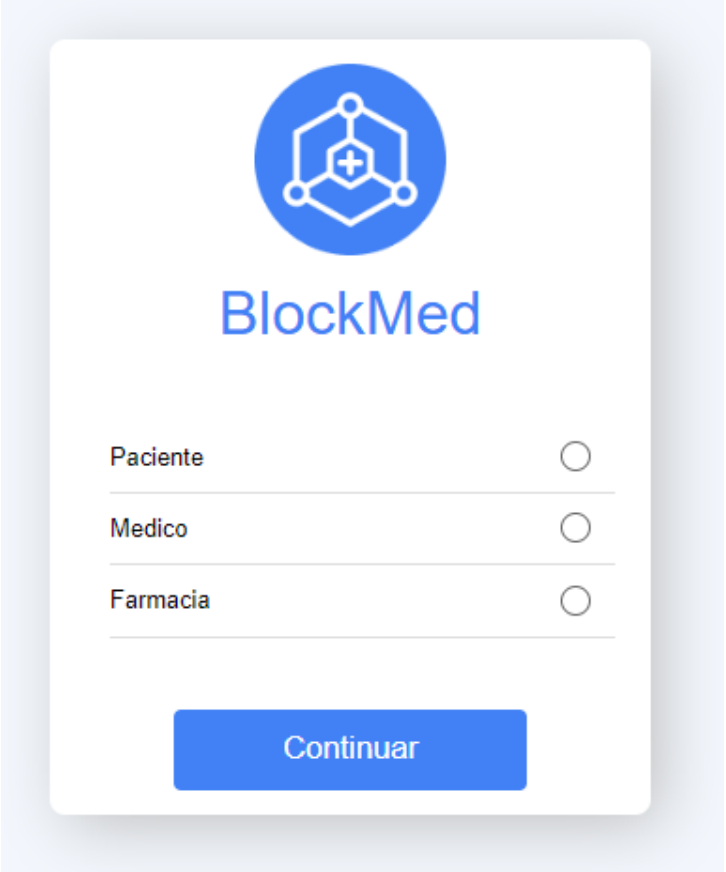


The View Certificate button allows you to open the details of the information contained in the generated certificate.

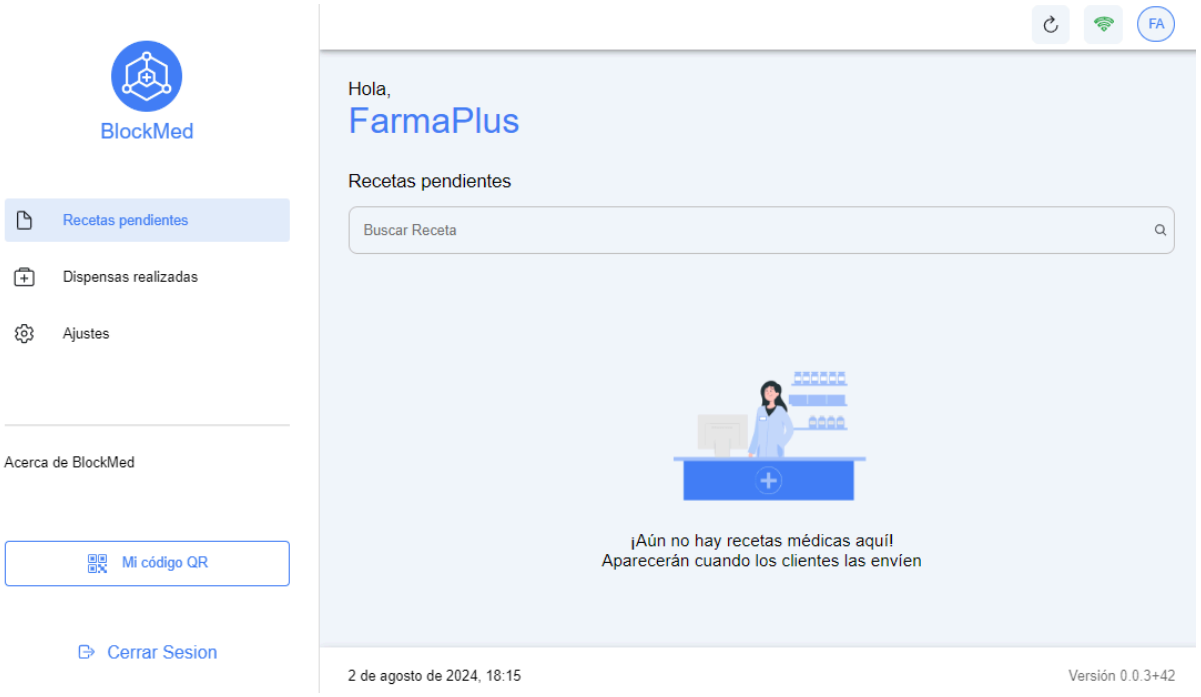


2.3. Pharmacy Registration

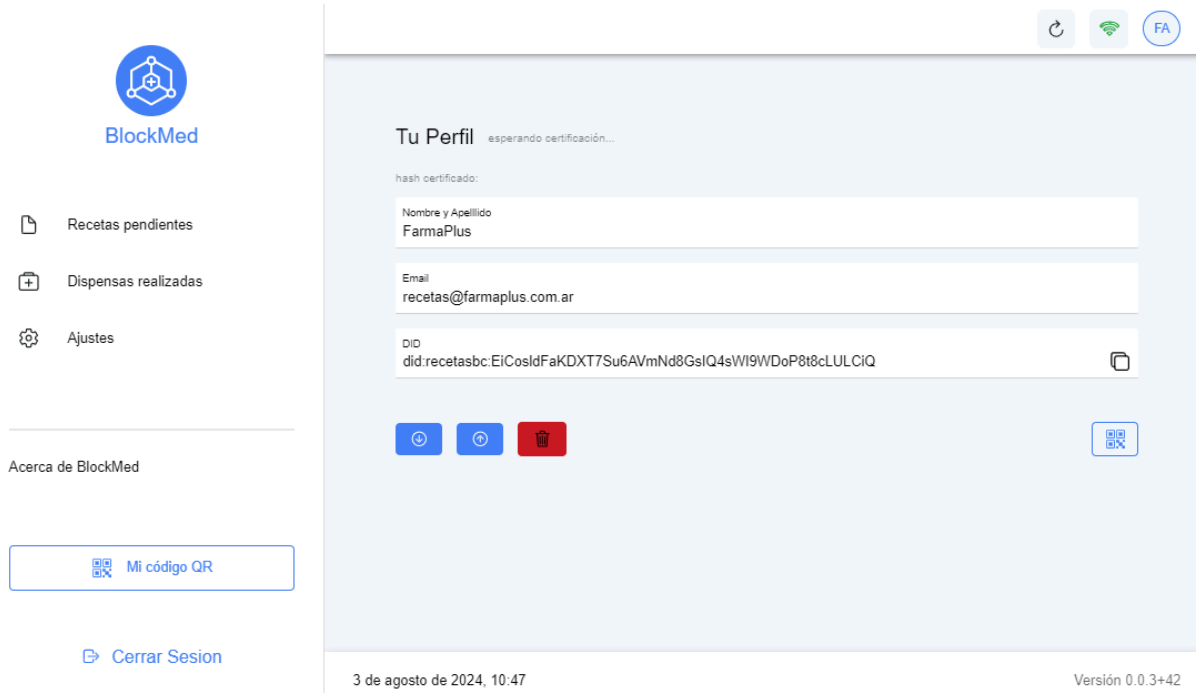
From the home screen at the URL https://app.recetasbc.com.ar, select the Pharmacy option and complete the fields for Pharmacy Name and Email.



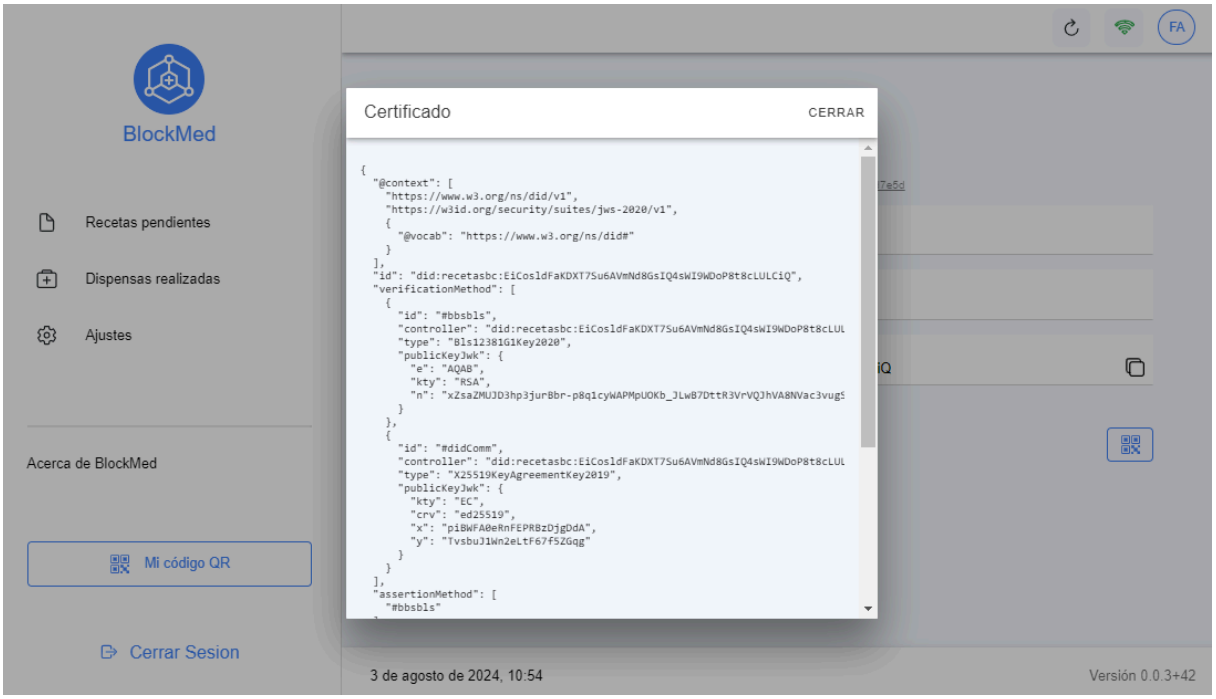
As you proceed with creating the profile, the Pharmacy Portal opens, with available functionalities that will be reviewed later in the Prescription Creation and Consumption Use Case. Unlike the patient and doctor profiles, the Pending Prescriptions and Dispensed Prescriptions buttons will be visible in the left menu.



By clicking the button with the initials of the name, as shown on the next screen, you can access the pharmacy's profile, displaying its Name, Email, and the generated DID, which is its unique identifier in the system. You can also see the QR code button that identifies the pharmacy.



As indicated in the patient and doctor creation cases, you will see the message "Waiting for certification...", indicating that the DID has been generated but certification has not yet been completed. Seconds or minutes later, you will be able to see the button to view the certificate and the hash with which it was recorded on the blockchain.



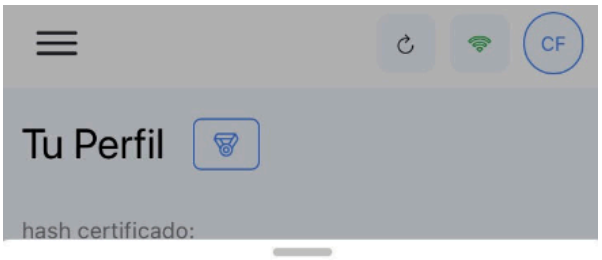
3. Use Case for Prescription Creation and Consumption

This section will describe the sequence of steps related to the mentioned use case.

At the time of prescription generation, its unique code or hash will be stored on the blockchain as a reference.

3.1. The Patient Shares Their DID with the Doctor

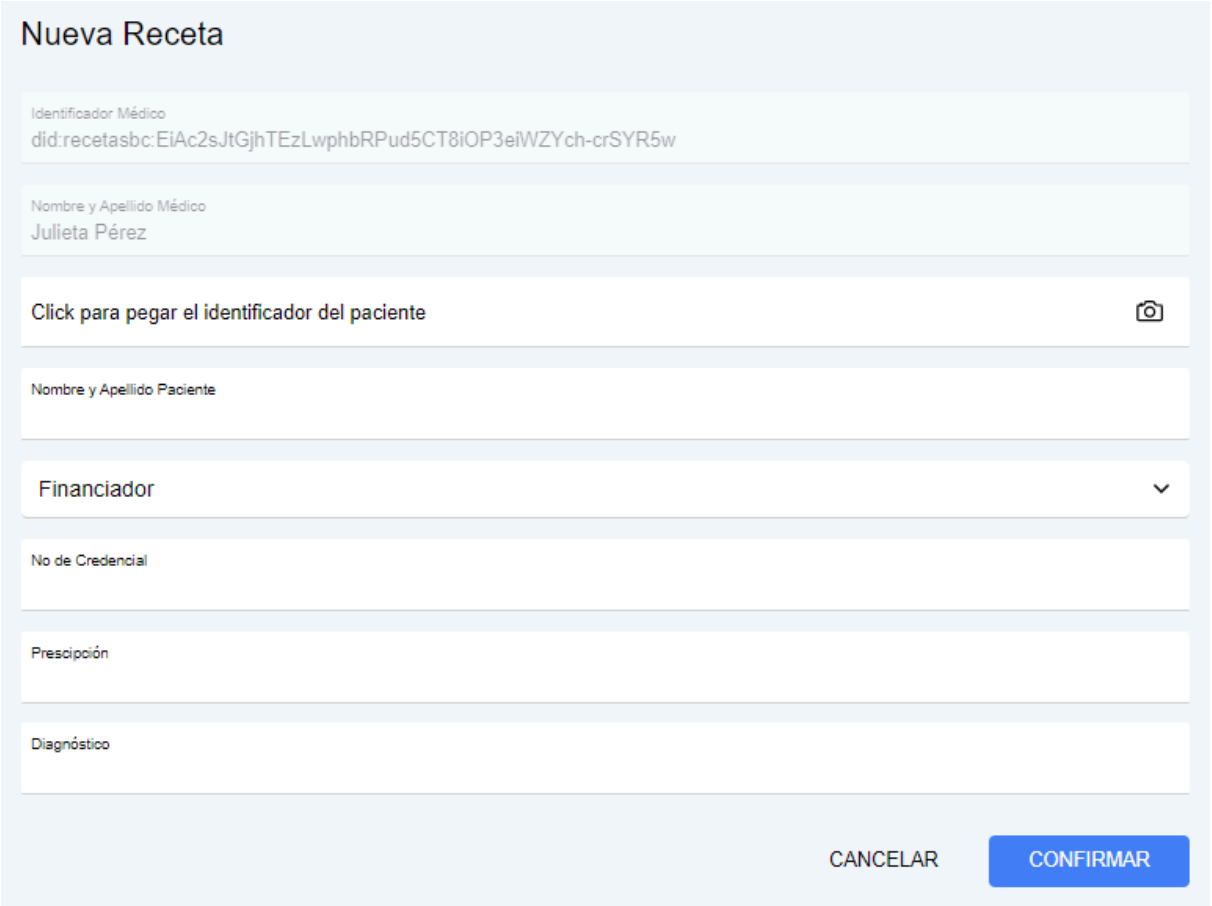
First, the patient must have their DID available to share with the doctor for recognition. To access the DID, the patient opens their profile and either opens the QR code for the doctor to scan or copies the code and sends it to the doctor.



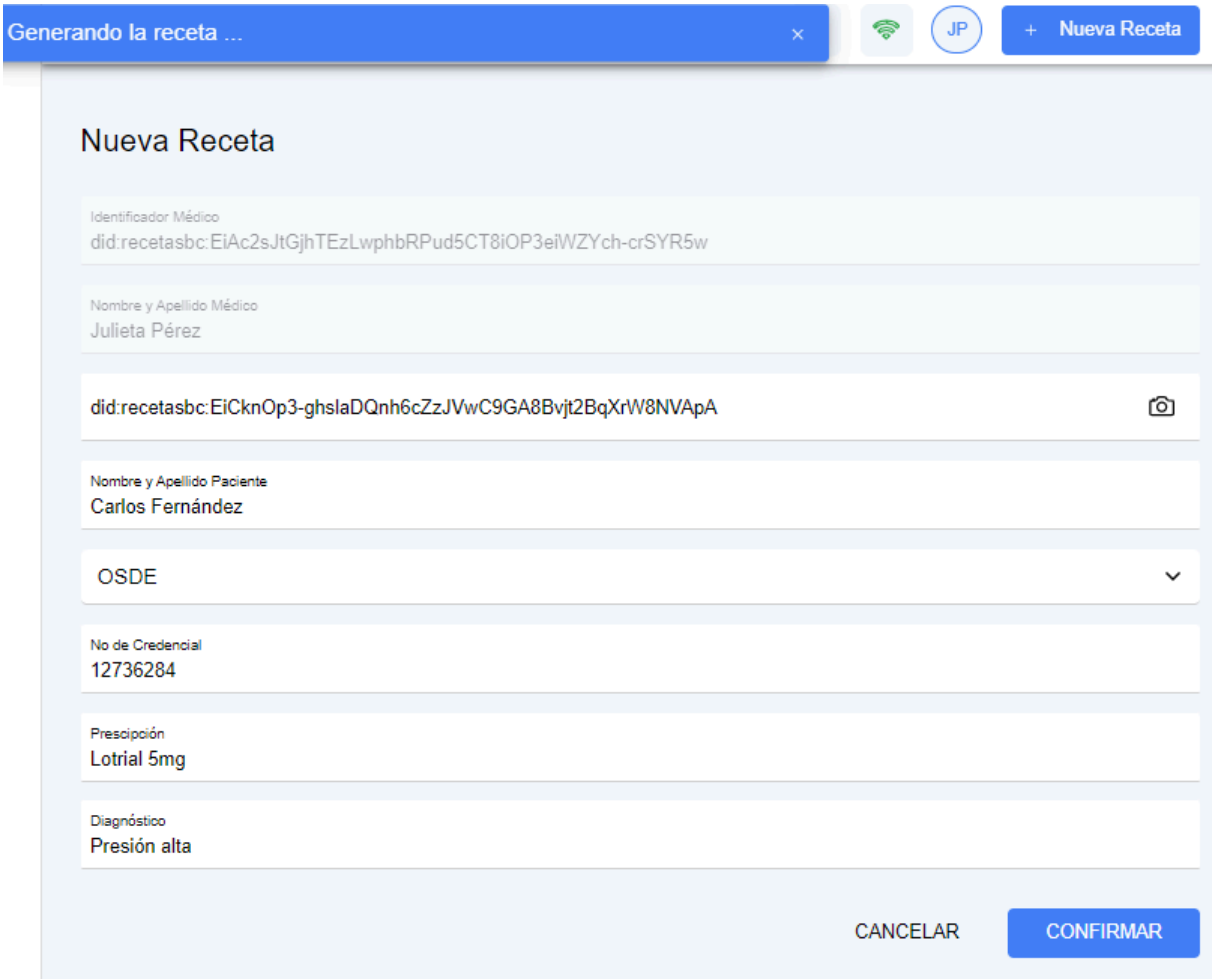
3.2. The Doctor Creates the Prescription for the Patient

The prescription generation process begins when the authorized doctor accesses their wallet and creates a prescription for the patient using the New Prescription button.

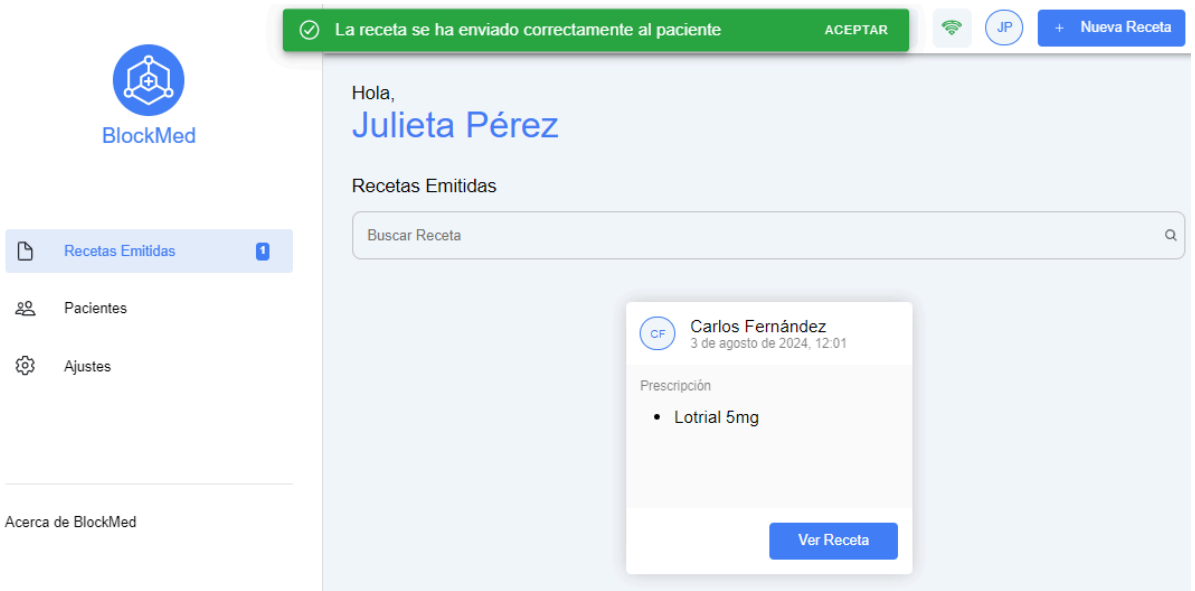
The form containing the prescription information that the doctor must complete is then displayed, starting with the patient's DID, which will identify the recipient of the prescription. As mentioned in the previous step, the DID can be obtained by scanning the patient’s QR code or using the code shared by the patient.



Once the prescription information is completed, it is confirmed, initiating the process of generating and recording the prescription on the blockchain, and its immediate sending to the patient and the healthcare insurance provider.

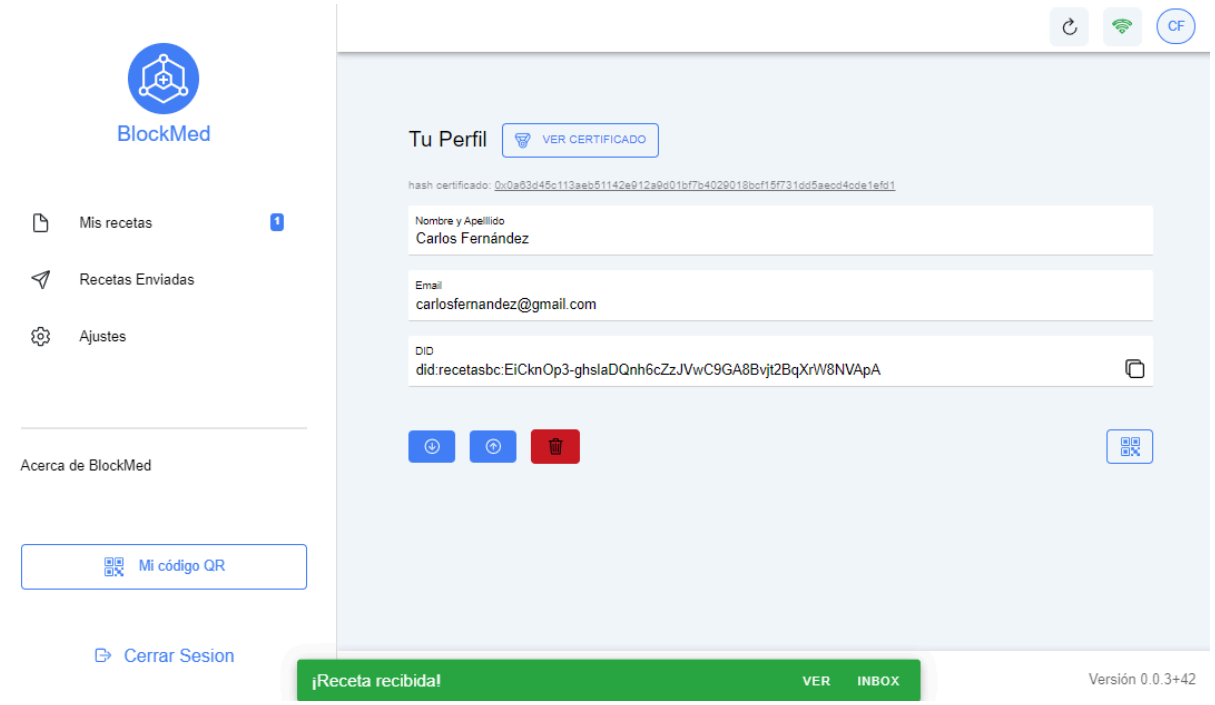


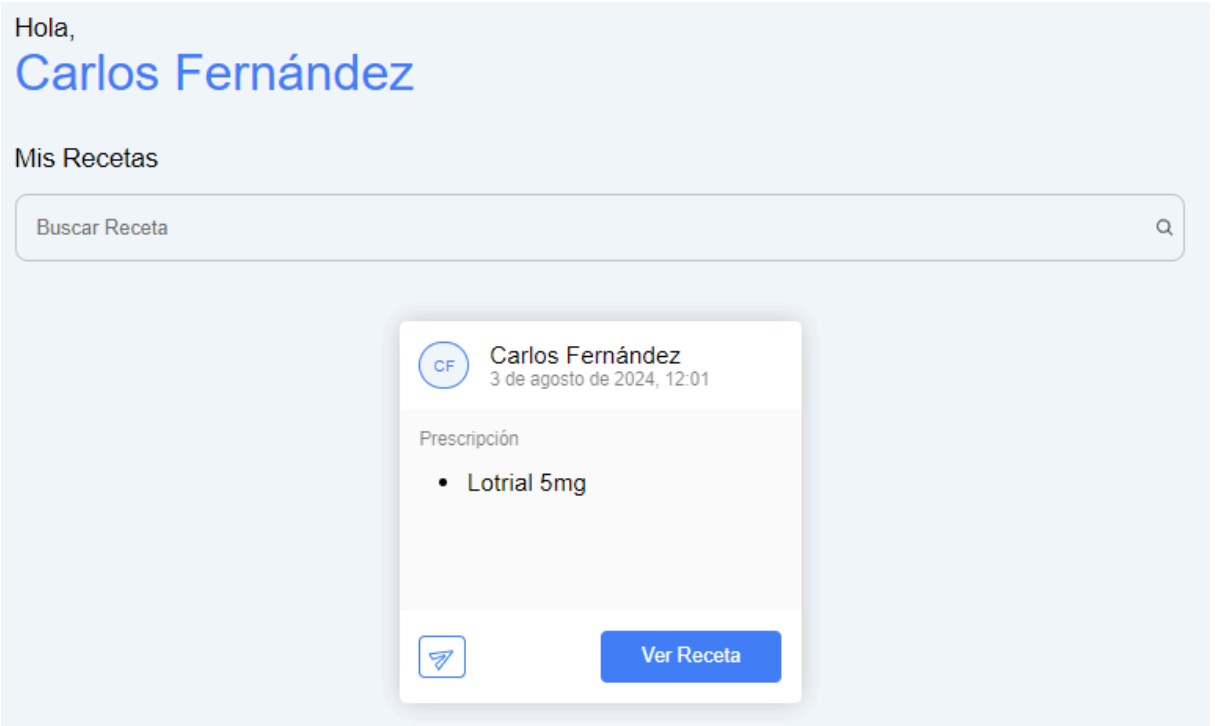
Upon completion of its generation, the prescription is stored in the Doctor's Sent Prescriptions tab.



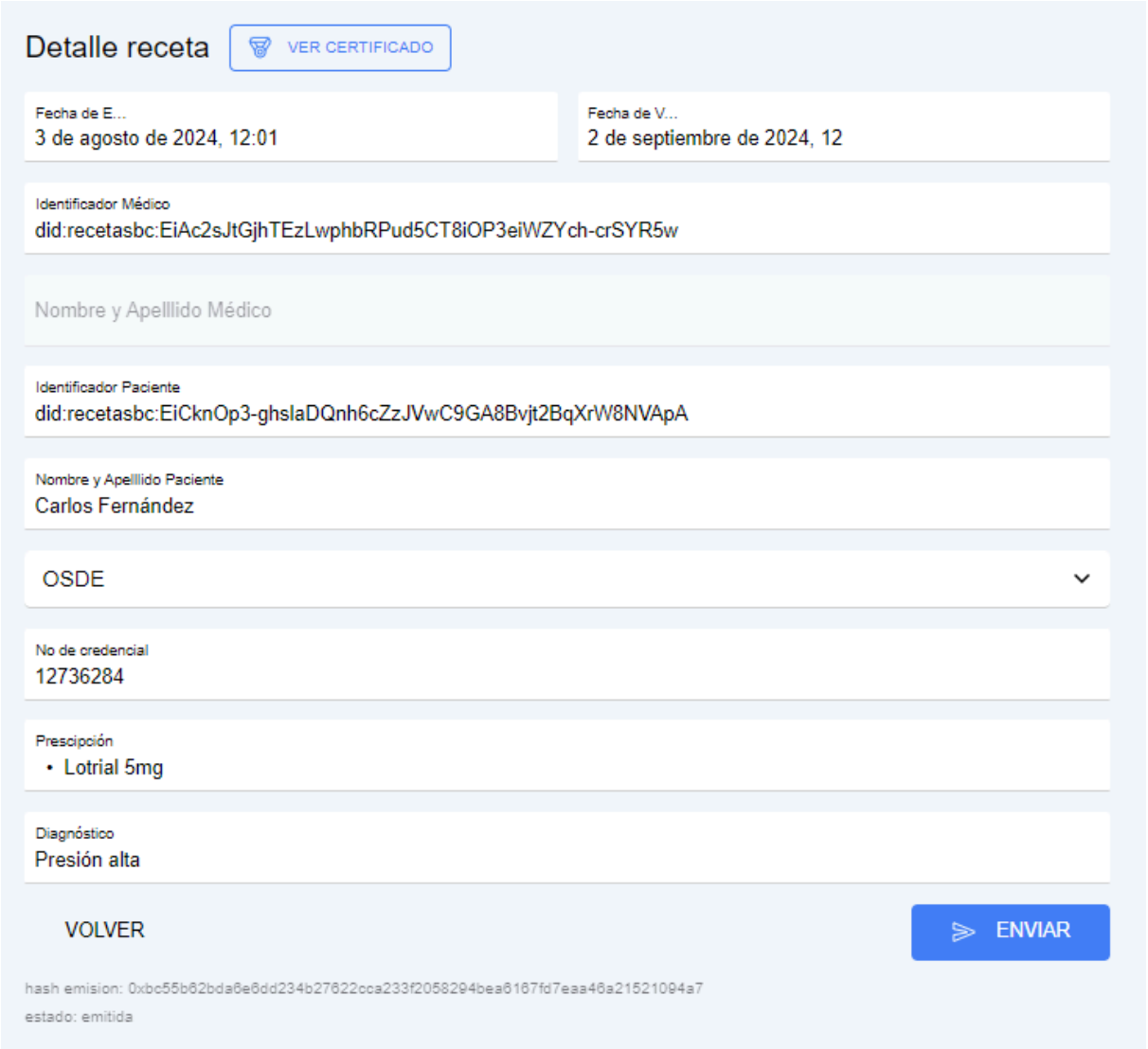
3.3. The Patient Receives the Prescription in Their Wallet

Immediately after its generation, the patient will receive a notification of the prescription received in their wallet, confirming its receipt. The My Prescriptions button will indicate the number of available prescriptions, and clicking it will show the list of prescriptions, including the new prescription generated by the doctor.





By clicking on the prescription, all its information can be viewed, including the information provided by the doctor, the creation date and time, the expiration date, and at the bottom of the screen, the emission hash recorded on the blockchain with the status “issued.”



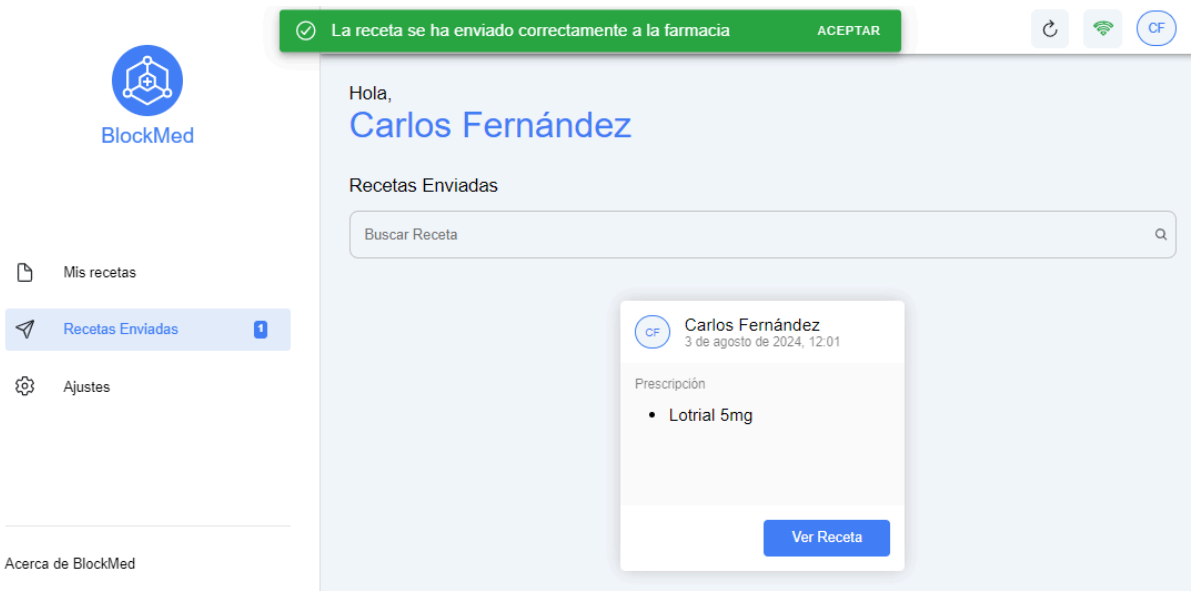
3.4. The Patient Recognizes the Pharmacy's DID

At this point, the patient is already at the pharmacy and needs to recognize the pharmacy's DID in order to send the prescription. To do this, the pharmacy must share its DID in the same way the patient shared theirs with the doctor at the beginning of the use case.

In this case, the pharmacy staff opens their profile and either opens the QR code for the patient to scan or copies the code and sends it to the patient.

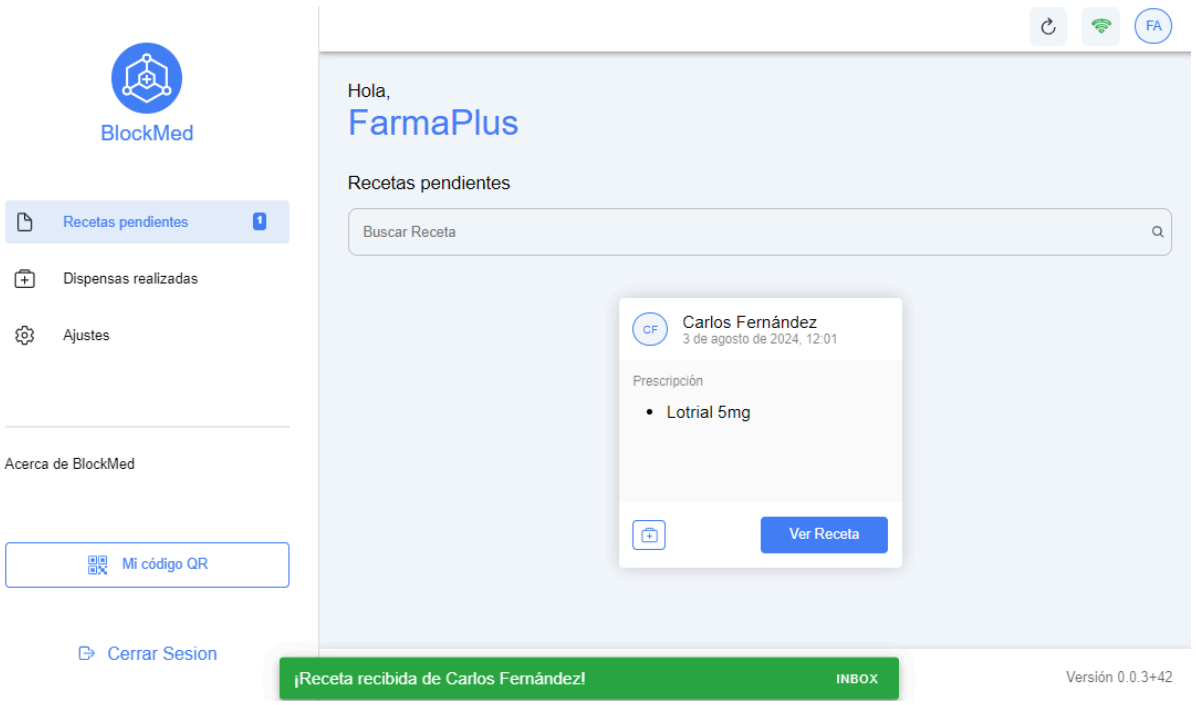
3.5. The Patient Sends the Prescription to the Pharmacy

By clicking the Send button and having registered the pharmacy's QR code, the prescription is sent to the pharmacy. The prescription moves from the My Prescriptions screen to the Sent Prescriptions screen.



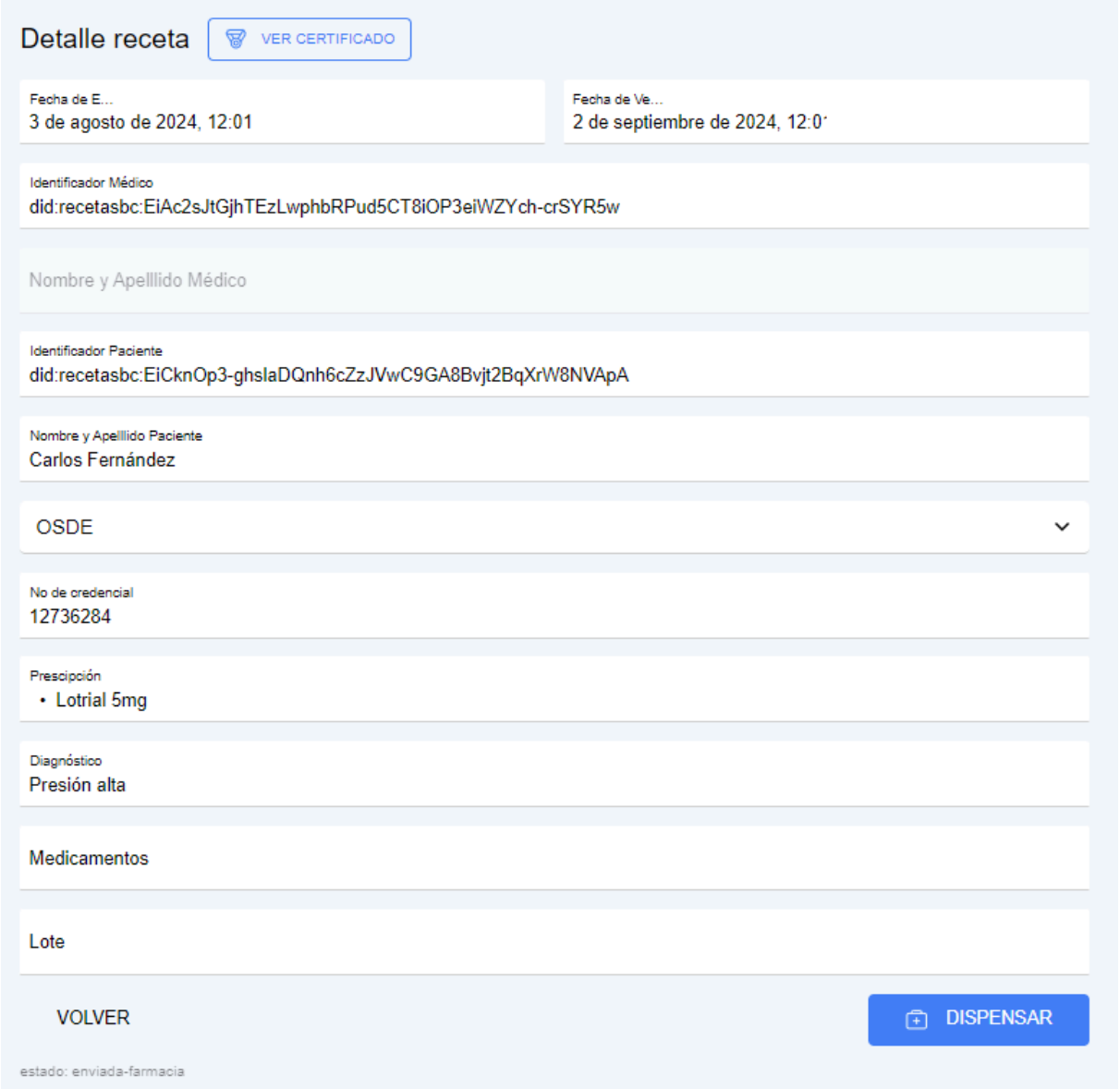
3.6. The Pharmacy Receives the Prescription on Its Portal

Immediately after, the pharmacy staff receives the prescription, which appears on the pending prescriptions screen.



When opening the prescription, all its information can be viewed, including the hash state reference at the end, in this case with the value “sent-to-pharmacy”.

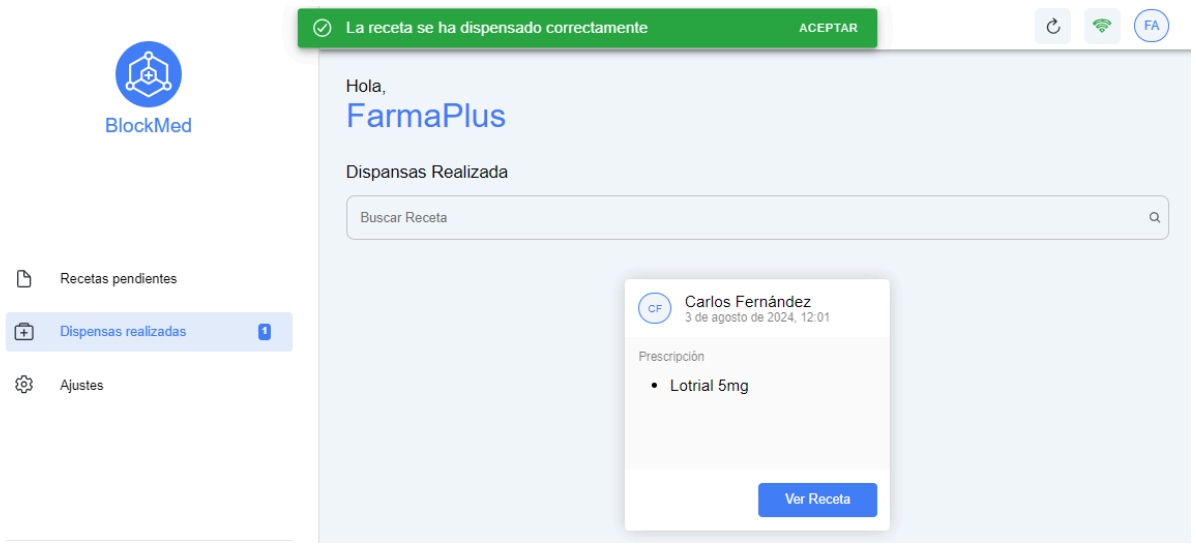
Additionally, the form contains the fields for Medications, referring to the commercial name of the medication, and Lot, indicating the lot to which the medication belongs, which must be completed by the pharmacy staff.



3.7. The Pharmacy Dispenses the Medication

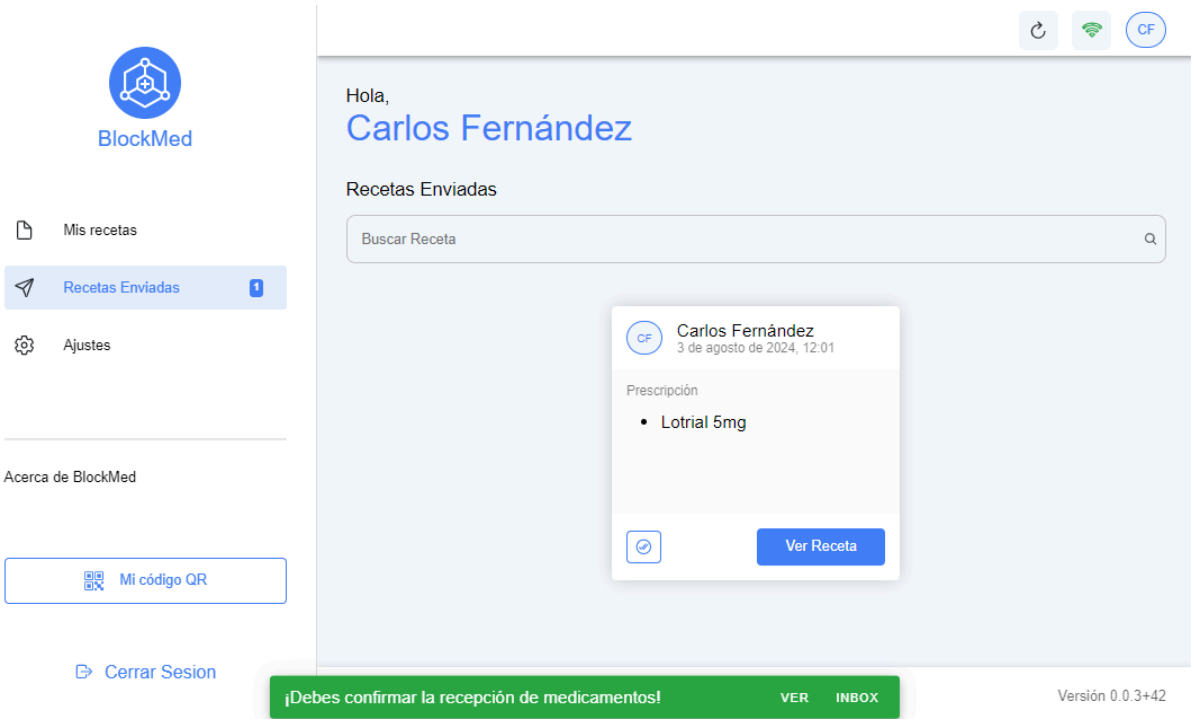
At this point, the Pharmacy staff proceed with their usual actions of validating the Patient's data, searching for the Medication, etc. Once all necessary actions are completed and the Medication is handed to the Patient, the Pharmacy fills in the mentioned fields for Medications and Batch, and confirms the Dispensing of the medication.

In this way, the Prescription moves to the dispensed Prescriptions screen.



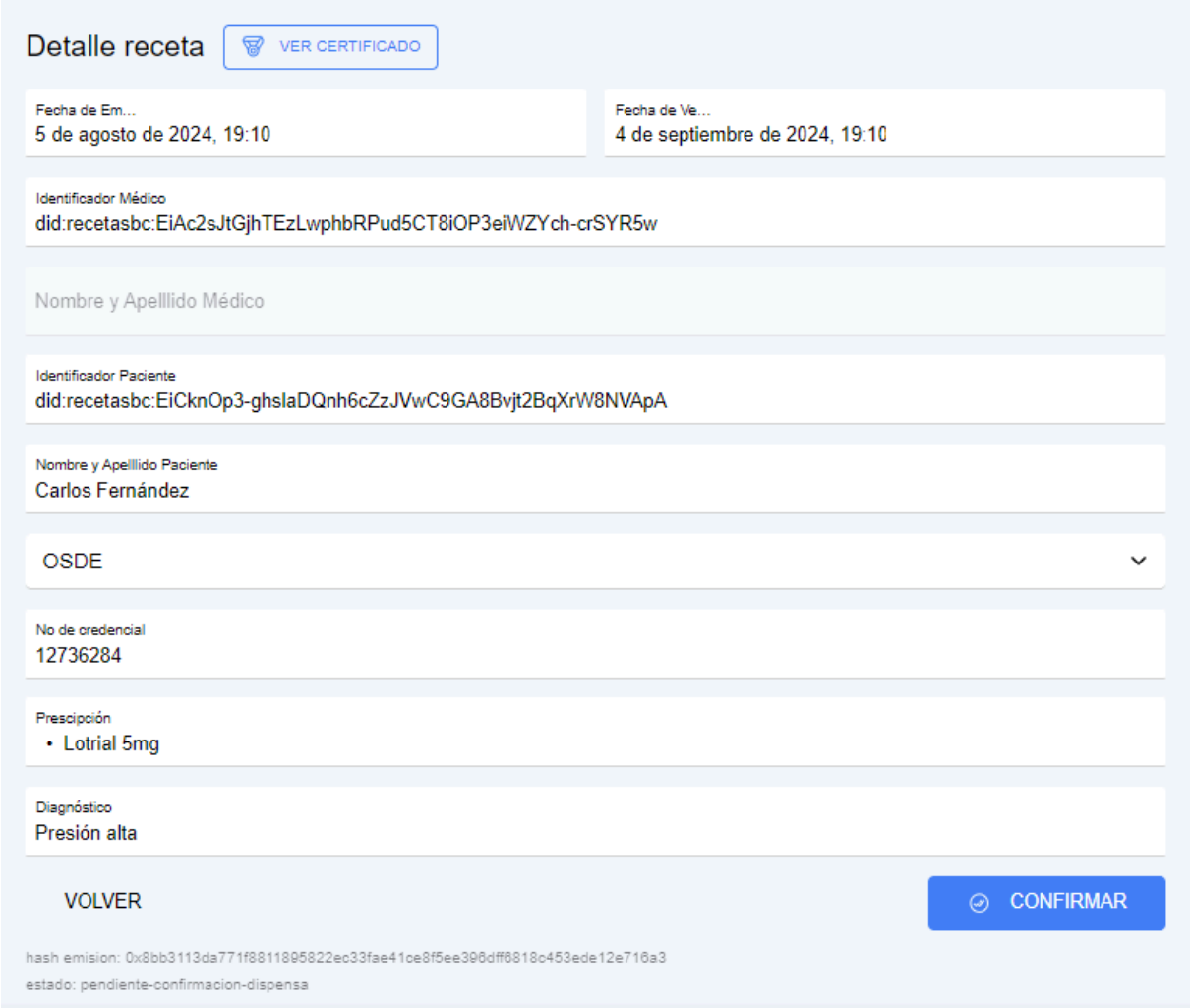
3.8. The Patient Receives the Dispensing Notification for the Medication

Immediately afterwards, the Patient receives a notification about the dispensing, requesting confirmation of the receipt of the Medication.

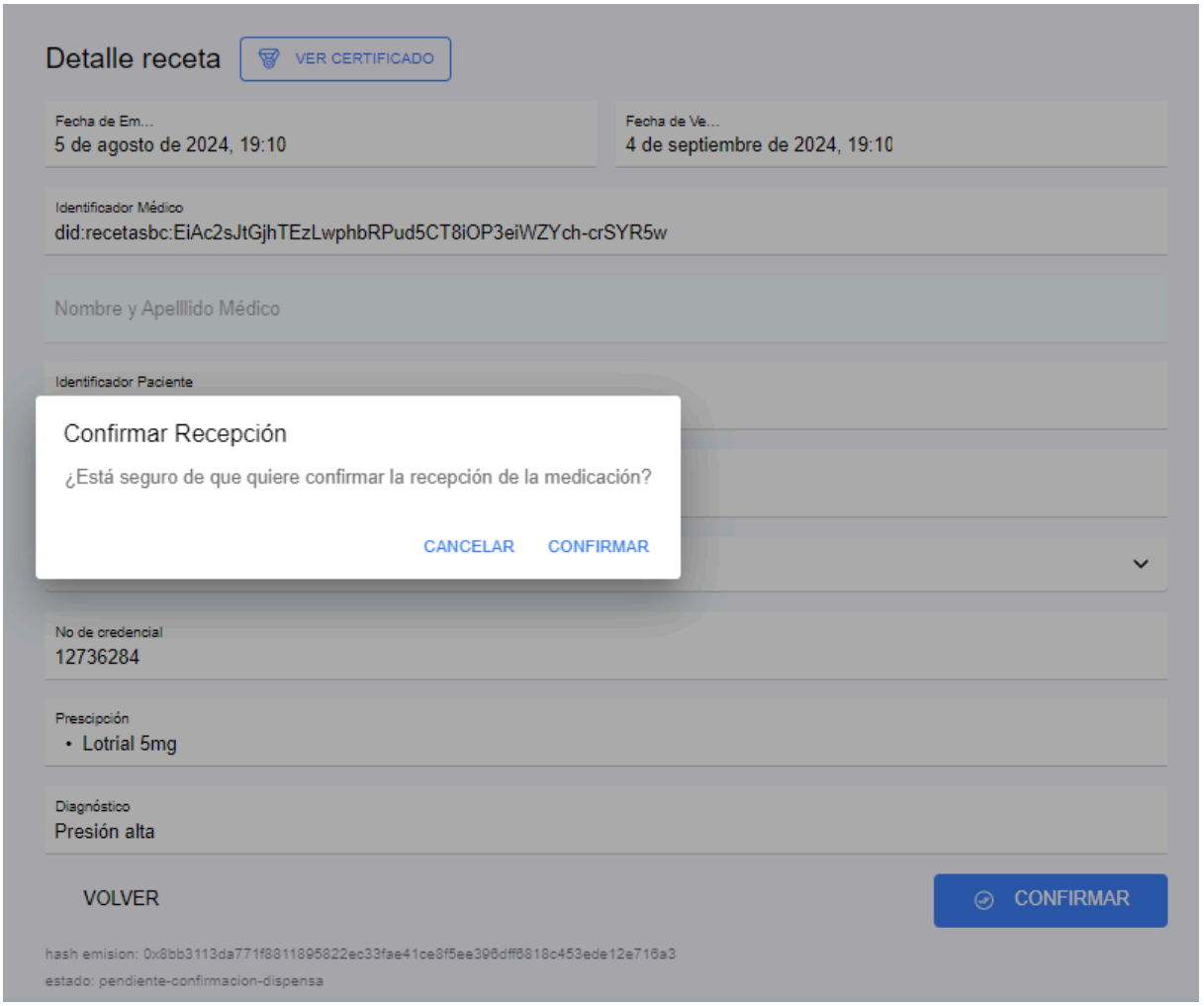


3.9. The Patient Confirms the Receipt of the Medication

At this moment, the Prescription is pending Confirmation. The Patient then accesses the Prescription, which now contains the additional reference of the hash status at the end, in this case with the value "pending-dispensing-confirmation," along with the Confirm button.



When clicking the Confirm button, a window is displayed to confirm the receipt of the Medication, representing the instance of the Prescription being signed by the Patient.


Detalle receta
VER CERTIFICADO
Fecha de Em...
5 de agosto de 2024, 19:10
Fecha de Ve...
4 de septiembre de 2024, 19:10
Identificador Médico
did:recetasbc:EiAc2sJtGjhTEzLwphbRPud5CT8iOP3eiWZYch-crSYR5w
Nombre y Apelllido Médico
Identificador Paciente
Confirmar Recepción
¿Está seguro de que quiere confirmar la recepción de la medicación?
CANCELAR
CONFIRMAR
No de credencial
12736284
Prescipción
• Lotrial 5mg
Diagnóstico
Presión alta
VOLVER
CONFIRMAR
hash emision: 0x8bb3113da771f881189582 2ec33fae41ce8f5ee396dff6818c453ede12e716a3
estado: pendiente-confirmacion-dispensa

3.10. The Prescription Reaches Its Final State

When the Patient clicks the Confirm button, a message saying "Reception sent" is displayed. Upon viewing the Prescription, all its known information is visible, now including the details of the status "consumed" and the hash of the dispensing operation recorded on the blockchain.