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# PEDRO: A Peer-to-Peer Support Platform for Adverse Drug Reaction Management in Patients with CLL

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**Abstract.** Chronic Lymphocytic Leukemia (CLL) treatment often leads to adverse drug reactions (ADRs) and drug-drug interactions (DDIs), significantly impacting patients' quality of life (QoL). To address the challenges in managing ADRs/DDIs, the PEDRO platform was developed to enhance communication between healthcare professionals (HCPs) managing patients with CLL in real-world healthcare settings and experts with significant research profiles in CLL. This paper presents the PEDRO platform built to provide a secure, scalable, and user-friendly solution for peer-to-peer (P2P) support in ADR/DDI management.

**Keywords.** eHealth, chronic lymphocytic leukemia, adverse drug reaction, drug-drug interactions

## 1. Introduction

Chronic Lymphocytic Leukemia (CLL) is the most common type of leukemia in adults in the Western world [1]. Despite advances in treatment techniques, CLL remains incurable, therefore improving patients' quality of life (QoL) is a top priority. The advent of novel targeted agents has revolutionized the treatment landscape of CLL, however, these drugs frequently lead to adverse drug reactions (ADRs) and can have drug-drug interactions (DDIs) [2].

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Effective management of ADRs and DDIs is crucial to improving patients' QoL and to ensure treatment adherence [3]. Inadequate management can result in noncompliance, worse health outcomes, and higher healthcare costs [4].

The rapid developments in the CLL treatment landscape pose significant difficulties in optimally managing CLL treatment regimens [5]. Hematologists who do not specialize in CLL but still treat patients with CLL can benefit from communicating with CLL experts who could guide them in managing these complications [6].

The PEDRO[2] platform was created to address this need by establishing an easy to use and secure path for direct contact between HCPs treating CLL in everyday healthcare settings on the one hand and CLL specialists on the other. This manuscript provides an overview of the platform's design, development process, functionality, and performance, providing insights into its efficacy and potential areas for improvement.

## 2. Methodology

### *2.1. Platform overview*

The PEDRO platform's architecture is designed to be modular, secure, and scalable, comprising several key components. Security measures include SSL/TLS encryption for data in transit, role-based access control for user permissions, and input validation and sanitization to prevent common web vulnerabilities.

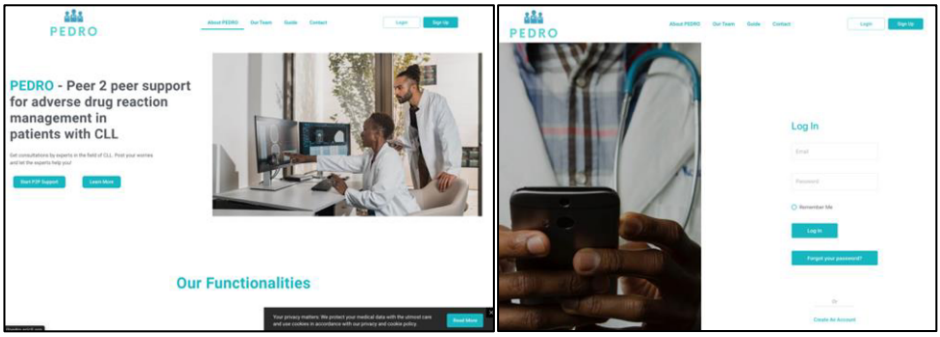


**Figure 1**. Front & Login Page of the PEDRO Platform.

### *2.2. User management*

HCPs register via a secure form, providing credentials that are verified by administrators to prevent unauthorized access. Users are assigned specific roles—HCP, Case Manager, Board Member, or Case Orchestrator—that dictate their permissions and access levels within the platform.

[2] The PEDRO app is available on https://pedro.ericll.org

### 2.3. Clinical helpdesk module

The Clinical Helpdesk (Figure 2) is the core feature, facilitating secure, private communication between HCPs and the so-called "support team", which handles each support request (also mentioned as a "case"). The "support team" (Figure 3) includes technical staff but also clinical experts who would provide relevant guidance to the asking HCP.

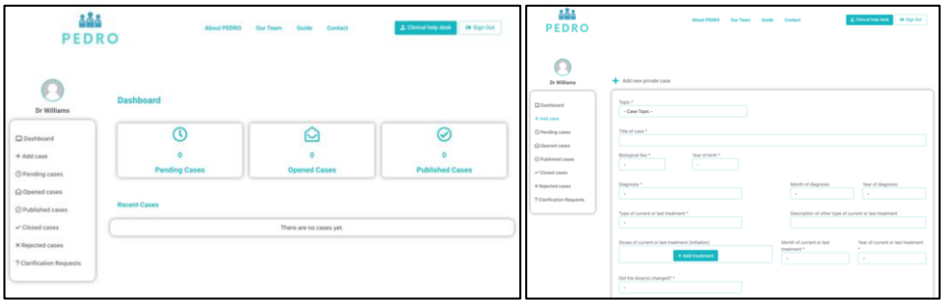


**Figure 2.** Clinical Helpdesk dashboard & add private case section.

### 2.4. Case submission

The process begins with HCPs submitting a case/request for support typically asking advice regarding the management of a specific ADR, using a custom form that captures detailed clinical information, symptoms etc. Case Orchestrators receive notifications of new cases and assign them to appropriate Case Managers based on expertise and workload.

Case Managers collaborate with Board Members through internal messaging. A revision history is maintained for accountability and tracking changes. Finalized responses are sent to the HCP through the platform's messaging system, and a secure chat is established for follow-up questions or clarifications. Figure 3 illustrates the complete case submission and management process.

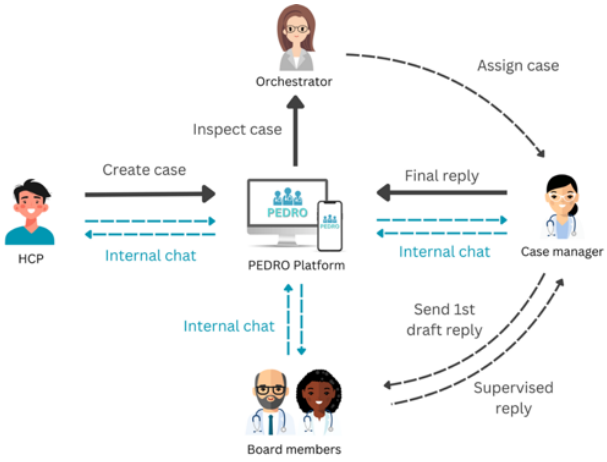


**Figure 3.** Private case system of PEDRO platform

## 3. Results

Since its launch, the PEDRO platform has successfully onboarded 49 healthcare professionals, reflecting significant user adoption and engagement (Figure 4). The onboarding process, including user verification and training, has received positive feedback for its simplicity and efficiency.

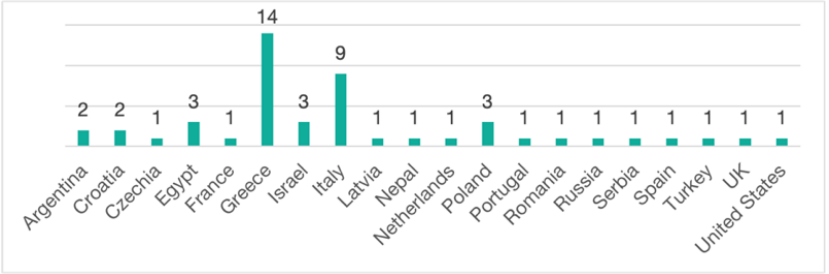


**Figure 4.** User Distribution by Country

Initial cases submitted through PEDRO have shown high efficiency in resolution times. On average, cases are assigned to a Case Manager within 12 hours, with expert feedback provided within three to five days.

## 4. Discussion

The PEDRO platform aspires to positively impact clinical practice by enhancing collaboration between healthcare professionals and CLL experts. The PEDRO platform enables direct communication, supporting informed clinical decisions and timely expert input to improve ADRs management and patient outcomes. It also fosters continued education by allowing HCPs to learn from expert responses.

### *4.1. Strengths of the platform*

A key strength of the PEDRO platform is its support team, which consists of case managers and leading physicians in the field of CLL. Their expertise ensures that guidance provided to HCPs is accurate, up-to-date enhancing the platform's credibility.

### *4.2. Limitations*

Despite its strengths, the platform has limitations. It currently does not integrate with Electronic Health Record (EHR) systems, requiring manual data entry and retrieval, which can be time-consuming and error-prone. As usage increases, further optimization and infrastructure upgrades may be needed to maintain performance levels.

### *4.3. Future work*

To enhance the PEDRO platform and address current limitations, we will focus on improving scalability and attracting more users. Regular performance testing will identify bottlenecks for timely resolution.

Expanding our user base is crucial for maximizing the platform's impact on clinical practice. We will implement a comprehensive dissemination strategy involving medical conferences outreach and workshops, journals publications, institutional collaborations, digital marketing, and offering of user training and support services. These efforts aim to raise awareness, encourage adoption, and improve the management of ADRs and DDIs in CLL treatment.

Depending on the acceptance of the platform in the long term, a few more potential lines of work could also be identified. For example, the study of the P2P interaction patterns could be analyzed – if indeed enough interactions exist in the future. Such an analysis could provide insights in terms of the use of P2P platforms to support clinicians beyond ADRs.

## 5. Conclusions

The PEDRO platform may be effectively used to address the need for improved communication and management of adverse drug reactions and drug-drug interactions in CLL treatment. The technical approach of utilizing WordPress with custom functionalities aims to be a viable solution, offering flexibility and scalability. Initial results demonstrate positive user engagement, strong system performance, and potential benefits to clinical practice.

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