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Project Identity (1/2)

- **Project Title**: PVClinical – Ενεργή Φαρμακοεπαγρύπνηση σε Κλινικά Περιβάλλοντα
- **Funding Body**: EPAnEK 2014-2020 Operational Programme co-financed by Greece and the European Union
- **Reference Code**: T1EDK-0789
- **Consortium**:  
  *Project & Scientific Coordinator*: Institute of Applied Biosciences (INEB), Centre for Research and Technology Hellas (CERTH)  
  *Partners*: PHARMASSIST Ltd, Papageorgiou General Hospital, European Interbalkan Medical Center
Project Identity (2/2)

- Call: II. Synergies between Companies and Research Centers
- Axis: Health and Medicines
- Topic: 5.5 Electronic Health: Services and Systems for Patients/Citizens and Healthcare Professionals
- Priority: 5.5.4 Decision Support Systems for Detection, Prevention and/or Surveillance of Adverse Drug Events in the Clinical Environment
- Duration: 36 months
- Total funding: 917,200,00€
Pharmacovigilance

- “… the science and activities relating to the detection, assessment, understanding and prevention of adverse effects or any other possible drug-related problems” [1]

- It is being carried out by:
  - Regulatory authorities (e.g. EOF in Greece, FDA in the US, EMA in Europe)
  - Drug Monitoring Organizations (e.g. Uppsala Monitoring Centre – WHO Collaborating Centre for Drug Monitoring / WHO-UMC)
  - Pharmaceutical companies
  - Contract Research Organizations (CROs)

Adverse Drug Effects: Problem Dimensions

The Costs of Adverse Drug Events in Hospitalized Patients

David W. B

Janet Su

Journal of Ph

Adverse Drug Events in Hospitalized Patients
Excess Length of Stay, Extra Costs, and Attributable Mortality

David C. Classen, MD, MS; Stephen J. Doherty, MD

Author Affiliations

JAMA. 1997;277(4):301-306

The economic burden of preventable adverse drug reactions: a systematic review of observational studies

D Formica, J Sultana, PM Cutroneo, S Lucchesi, R Angelica, S Crisafulli, Y Ingrasciotta, F Salvo, E Spina & G Trifirò
The Estimated “Impact” of Adverse Drug Effects

- **In the US:**
  - 4\textsuperscript{th}-6\textsuperscript{th} most frequent cause of deaths, with more 100,000 deaths annually in hospitals
  - Cause for 7\% hospital admissions
  - Financial burden of 137-177 billion\$ annually

- **In Europe:**
  - Cost of preventable adverse drug effects account between 2,851-9,015 € in hospitalized patients
  - Prolonged hospital stay of 6.1 ± 2.3 days

→ A serious Public Health problem!
Prevention of Adverse Drugs Reactions: 
Do we Have the Required Knowledge?

**CLINICAL STUDIES FOR DRUG DEVELOPMENT**

Drug tested in a specific population in normal dosages

**POST-MARKETING DRUG EXPOSURE**

Exposure to the drug by an extremely larger and heterogeneous population under different conditions
Prevention of Adverse Drugs Reactions: 
*Do we Have the Required Knowledge?*

**Need for: Real-World Evidence!!!**
Spontaneous Reporting Systems: The Main Data Source for Adverse Drug Reactions

Reports of potential Adverse Drug Reactions from healthcare professionals/citizens sent to:

- National authorities (e.g. E.O.F. in Greece, Food and Drug Administration in the US)
- International drug monitoring organizations (e.g. European Medicines Agency, Uppsala Monitoring Centre – WHO Collaborating Centre for Drug Monitoring)
- Pharma companies / Contract Research Organizations
Spontaneous Reporting Systems: *The Main Data Source for Adverse Drug Reactions*
Limitations of Spontaneous Reporting Systems

- They gather a very low number of reports, given the magnitude of the problem (many studies account this below 5%)
- Missing data
- Allegations of biased reports
  - ...

→ Spontaneous Reporting Systems are not enough for effective Pharmacovigilance!
The Need for a Paradigm Shift: From *Passive* to *Active* Pharmacovigilance

**PHARMACOVIGILANCE**

- **Passive**: No other measures are taken to search for potential Adverse Drug Reactions besides encouraging reporting.

- **Active**: search other electronic databases for any information that can be useful.

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**Continuous Learning Health System**
Exploitation of Further (including Emerging) Data Sources

- **Secondary data use** acquired during the clinical practice (e.g. in the Electronic Medical Record of hospitals/clinics)

- Other data sources:
  - Scientific bibliography
  - Mobile health (mHealth) apps
  - Social media platforms

- Major Pros/Cons:
  - Availability of big data
  - Data heterogeneity
The PVClinical Scope

- **Active pharmacovigilance** in the clinical environment via appropriate support IT tools for:
  - Concurrent exploitation of multiple data sources, i.e. Spontaneous Reporting Systems, Bibliography, Social Media, Electronic Medical Records
  - Emphasis on the investigation of new, potential Adverse Drug Reactions

- **Enabling Technologies:**
  - Knowledge Engineering
  - Linked Data
  - Standard terminologies/thesauri
  - Big data management and analytics

- **Extensions:**
  - Beyond clinical environments (e.g. Drug Monitoring Organizations, Pharmaceutical Companies, Contract Research Organizations, ...)

The PVClinical Approach (1/2)
The PVClinical Approach (2/2)

Clinical environment
- Drug Administration

Patient Monitoring
- Waiting
- Thought

ADR Signal investigation
- Clinical practice improvement
- Monitor in time scale
- Cost reduction

ADR Signal Investigation
- Consolidating data sources in one unified data model
  - Spontaneous report systems
  - Literature
  - Electronic Health Records
  - Social Media
- Computational approaches
  - Signal detection (e.g. disproportionality analysis)
  - Causality indexes
- Analytics
  - Unified statistical data
  - Linked data
  - Time monitoring

Non clinical environment
- Drug design
- Clinical Trials
- ADR Signal investigation
- Product enhancement
# Project Structure: Work Packages

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<th>Work Package (WP)</th>
<th>Leader</th>
<th>Duration</th>
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<td>WP1: User Requirements Analysis, Specifications and System Architecture</td>
<td>PHARMA</td>
<td>M1-M12</td>
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<td>WP2: Design and Development of Data Collection Infrastructure</td>
<td>CERTH</td>
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<td>WP3: Design and Development of Data Analysis Methods</td>
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<td>WP4: Implementation of the Web Platform</td>
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<td>WP6: Feasibility Study on Commercial Applicability</td>
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<td>WP7: SME Participation in Exhibitions</td>
<td>PHARMA</td>
<td>M15-M36</td>
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The primary aim is the introduction of the proposed platform in the clinical environment, offering the potential to systematize and automate/guide the investigation of potential Adverse Drug Reaction signals. This will enable hospitals to implement active pharmacovigilance with major benefits for public health (patient safety, quality of care) and a cost reduction as regards the management of Adverse Drug Reactions. Primary users of the PVClinical platform are clinicians (pharmacists, clinical pharmacologists and pharmacovigilance experts)
Extending the PVClinical Scope Beyond Clinical Environments

Monitoring Organizations / Drug Regulatory Authorities: May use the PVClinical platform to detect and assess potential Adverse Drug Reaction signals, saving cost and time for the entailed analysis.

Pharmaceutical Companies / Contract Research Organizations: May use the PVClinical platform for post-marketing surveillance of the products of interest, or for drug repositioning studies, aiming to save cost and time for the entailed analysis.

During Clinical trials: The detection of Adverse Drug Reactions is an important part of clinical trials. The PVClinical platform may reinforce the capabilities of reporting and documenting potential Adverse Drug Reactions, enhancing the quality of the procedure and potentially contributing to cost reduction in clinical trial conduction.
Contact & Further Information

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https://pvclinical-project.eu/

Acknowledgment: This research has been co-financed by the European Union and Greek national funds through the Operational Program Competitiveness, Entrepreneurship and Innovation, under the call RESEARCH – CREATE – INNOVATE (project code: T1EΔK-03789)