

# Optimizing Integration with the Italian EHR: The Use of LOINC Codes

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**Abstract.** According to the regulation “*Decreto del Presidente del Consiglio dei Ministri*” (DPCM) of September 29, 2015, n.178, the Logical Observation Identifiers Names and Codes (LOINC) system is included among the coding systems adopted in the Italian Electronic Health Record (EHR). As part of the Digital Health Solutions in Community Medicine (DHEAL-COM) project, one key goal is to categorize parameters using international classification systems. This enables the identification of appropriate Information and Communication Technology (ICT) solutions tailored to support people’s health needs. Our objective is to incorporate LOINC codes for parameter categorization, thus anticipating the future use of EHR.

**Keywords.** LOINC, Electronic Health Record, Healthcare Data Mapping

## 1. Introduction

After Covid-19 closures, EU funded Europe's recovery, including Italy's National Recovery and Resilience Plan (PNRR). PNRR funds projects like DHEAL-COM, which also aims to assess health status for chronic disease patients and match them with suitable ICT solutions. To this end, in this first phase, the project uses two person models, known as *blueprint personas* [1], which act as concise representation of fictitious individuals of various ages, health conditions and medical requirements. These models help identify the specific health needs of the target population. These *blueprint personas'* characteristics, including health issues and treatments, are described textually and need coding to develop algorithms for ICT tool matching. The Italian rules on the EHR are based on the regulation DPCM of September 29, 2015, n. 178 [2]. This normative describes the minimum necessary core that makes up the structure of the EHR, including the coding systems adopted for documents, one of which is LOINC. We aim to integrate LOINC codes in *blueprint personas'* characteristic categorization to allow the reuse of the functions developed within the Italian EHR in the DHEAL-COM project.

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## 2. Materials and Methods

At first, the Current Procedural Terminology (CPT) coding system was used to code instrumental and laboratory tests, medical procedures, and reimbursement. However, where possible, we found it necessary to map the codes from CPT to LOINC, to allow for future interoperability with the EHR. To achieve this, we used the Unified Medical Language System (UMLS) Metathesaurus [3]. The UMLS' strength are the Concept Unique Identifiers (CUIs), used to identify and link synonymous terms from different coding systems [4]. However, for most of the terms we did not find an unambiguous match across CUIs, so we searched for terms with similar meanings.

## 3. Results

Table 1 shows only some of the mappings from CPT codes to LOINC codes performed.

**Table 1.** Mapping from CPT to LOINC codes.

CPT Code	CPT Description	LOINC Code	LOINC Description
84132	Potassium; serum, plasma or whole blood	77142-8	Potassium [Moles/volume] in Serum, Plasma or Blood
99474	Self-measured blood pressure	72076-3	Blood pressure home reading
95957	Digital analysis of EEG	11523-8	EEG study
99212	Office or other outpatient visit	11347-2	Outpatient visits
97116	Therapeutic procedure	89180-4	Motor function training performed

## 4. Discussion and Conclusions

Integration of LOINC codes to categorize *blueprint personas* allows alignment with the Italian HER regulations, increasing interoperability for future use. Despite the difficulties in mapping due to the complexity of medical terminology, the use of resources such as the UMLS Metathesaurus is critical to facilitate this process.

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