



# A dynamic update program for COVID-19 TestNorm - A tool to normalize COVID-19 testing names to LOINC codes

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## Background

Coronavirus disease 2019 (COVID-19) was declared a pandemic by the World Health Organization (WHO) on March 11th, 2020; it has become a serious global health crisis since then.

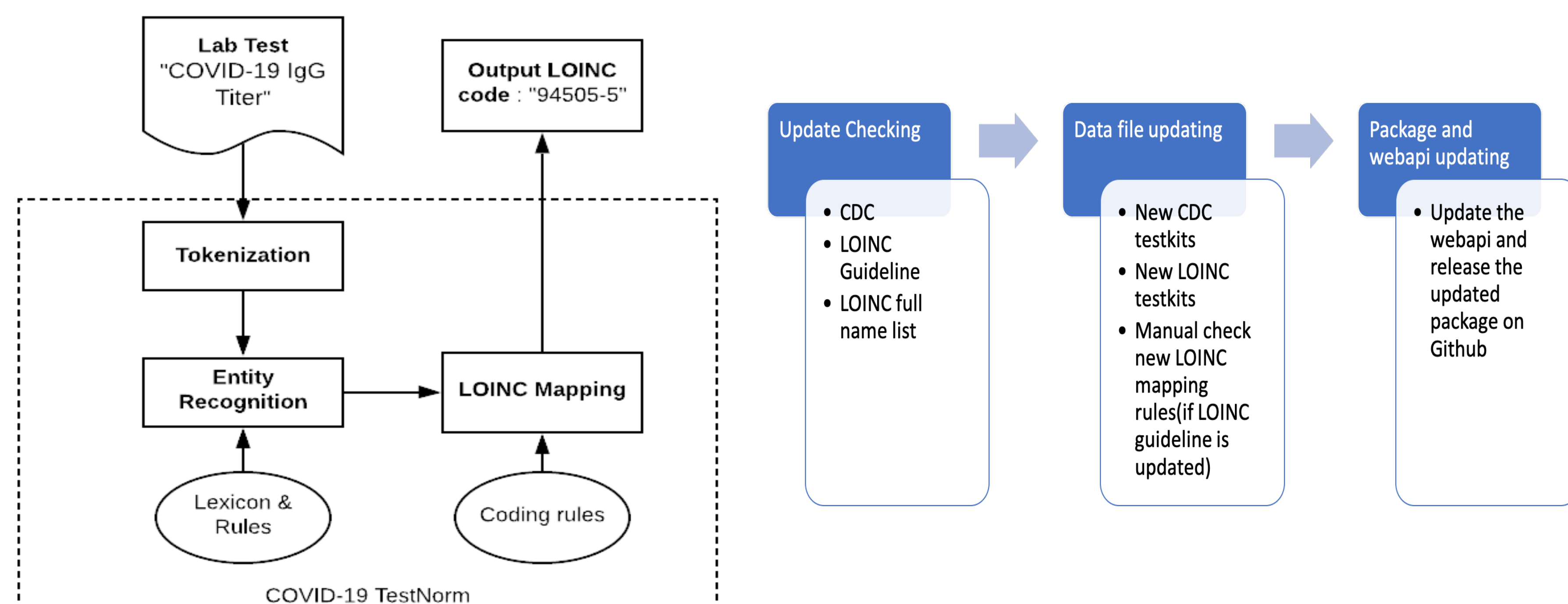
To efficiently conduct clinical studies across different institutions within a network, one requirement is to normalize clinical data to common data models (CDM) and standard terminologies. One such example is the (Observational Medical Outcomes Partnership) OMOP CDM maintained by the Observational Health Data Science and Informatics (OHDSI) consortium<sup>1</sup>. Among different types of clinical data, COVID-19 diagnostic tests are critical for all the following analyses, as they are the primary means to identify the confirmed COVID-19 cases. Nevertheless, there is a lack of mappings between local COVID-19 testing names and standard LOINC codes, which hampers cross-institutional studies that rely on normalized clinical data at each institution.

To address this urgent need for reliable mappings, we developed an automated tool -- COVID-19 TestNorm -- to normalize a local COVID-19 testing name to a standard LOINC code. This tool is available to the community via an open-source package at GitHub<sup>2</sup> and via an online web application<sup>3</sup>. Figure 1 shows an overview of the modules of the COVID-19 TestNorm system, mainly including entity recognition and LOINC mapping modules, with inputs from knowledge components such as lexicons and coding rules.

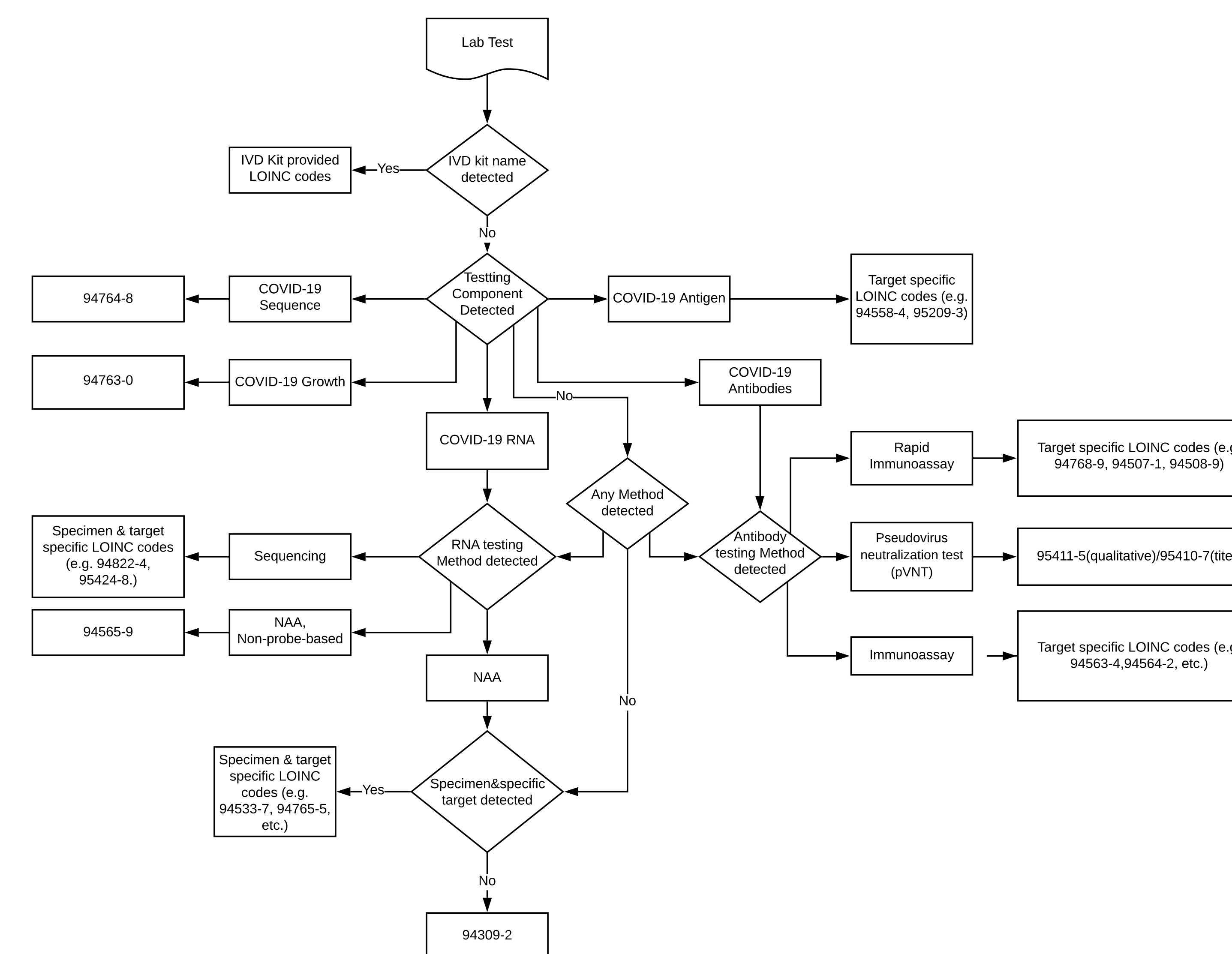
With new tests available in the market, the LOINC code sets for COVID-19 are evolving, i.e., with weekly updates from Regenstrief, as well as continuous updates from the CDC which maintains a file containing recommended LOINC mappings for test kits currently approved by the FDA. Therefore, in this study, we developed an automatic tool to keep updating our COVID-19 TestNorm with new code sets and updated coding rules.

## Methods

The LOINC guideline and the CDC test kits recommendations are continuously updated. To dynamically and efficiently update the COVID-19 tool accordingly, we developed an automatic program to detect the most recent updates from LOINC and CDC websites.



## The coding strategy of the COVID-19 TestNorm



## Results and Conclusions

As of Oct 19th, the COVID-19 TestNorm has been timely updated to the most recent version of the LOINC guidelines and the CDC recommendations for COVID-19 test kits, which were updated on July 07th. The automatic update checking program is working properly to ensure the timely update of the COVID-19 TestNorm tool to the most recent LOINC and CDC recommendations.

With the automatic update checking program, the COVID-19 TestNorm can dynamically update and therefore provide the most up-to-date mapping results to our end users.

## Acknowledgement, Disclaimer and Conflict of Interest

This project is partially supported by grants NCATS UL1TR003167, NCI U24 CA194215, VA HSR RES 13-457, NCATS 5U01TR002062, CPRIT RP170668, CPRIT RP160015, and Gordon and Betty Moore Foundation #9639.

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Dr. Xu and The University of Texas Health Science Center at Houston have research-related financial interests in Melax Technologies, Inc.