OBTAIN VALID DIAGNOSES FROM PRESCRIPTION DATA

Endel F.[1], Weisser A.[2], Filzmoser P.[1], Eisl A.[3], Endel G.[2]

[1] University of Technology, Vienna
[2] Main Association of Austrian Social Security Institutions
[3] Vienna University of Business Administration

P.Filzmoser@tuwien.ac.at

(1) BACKGROUND

This overview resembles the **data landscape** in the Austrian Social Security System. As displayed, **a lot of patient information** is available, however, there are some challenges that have to be faced.
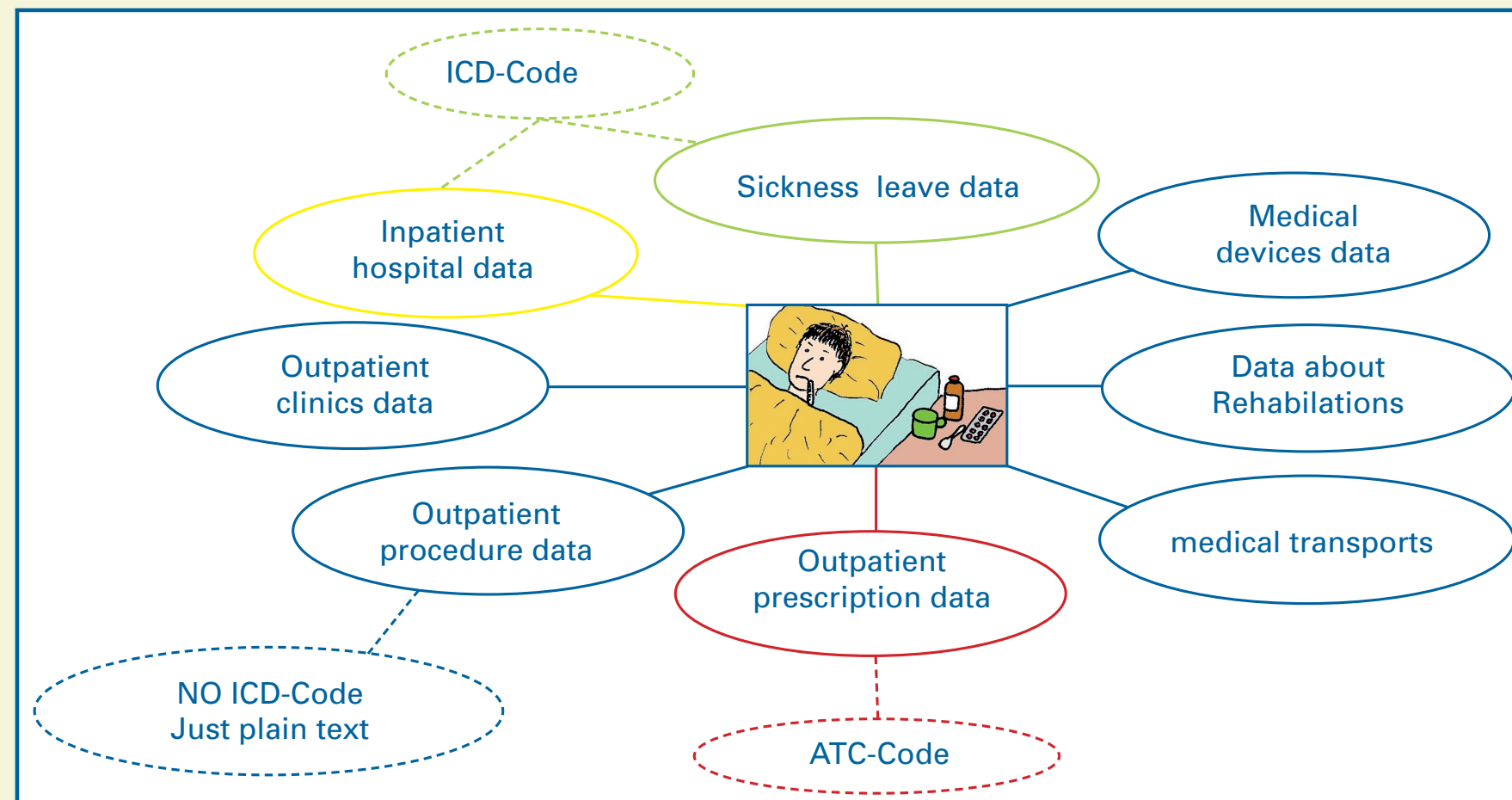
(2) PREREQUISITES

In the Austrian outpatient sector there is **no standardized coding of diagnoses**, ICD-Codes exist only for sickness leave data and inpatient hospital data. The only coded information available in the outpatient sector is ATC codes from prescription data. Therefore, a **matching between ATC-codes and ICD-9-codes** was conducted in order to **obtain valid diagnoses for each patient.**

The matching was conducted as presented at the **PCSI Conference 2010 in Munich.**

(3) THE CHALLENGE

Since the matching was conducted, the results have to be implemented into the database. The main issues to be addressed are:
1. multiple prescriptions of one ATC-code leading to the same set of different diagnoses
2. different ATC-codes leading to intersecting sets of diagnoses
3. different ATC-codes leading to different, independent sets of diagnoses
In reality, a combination of the 3 aforementioned cases will most likely occur. Moreover, aggregating the probabilities that connect the ATC-codes to the ICD-codes is a non-trivial task.
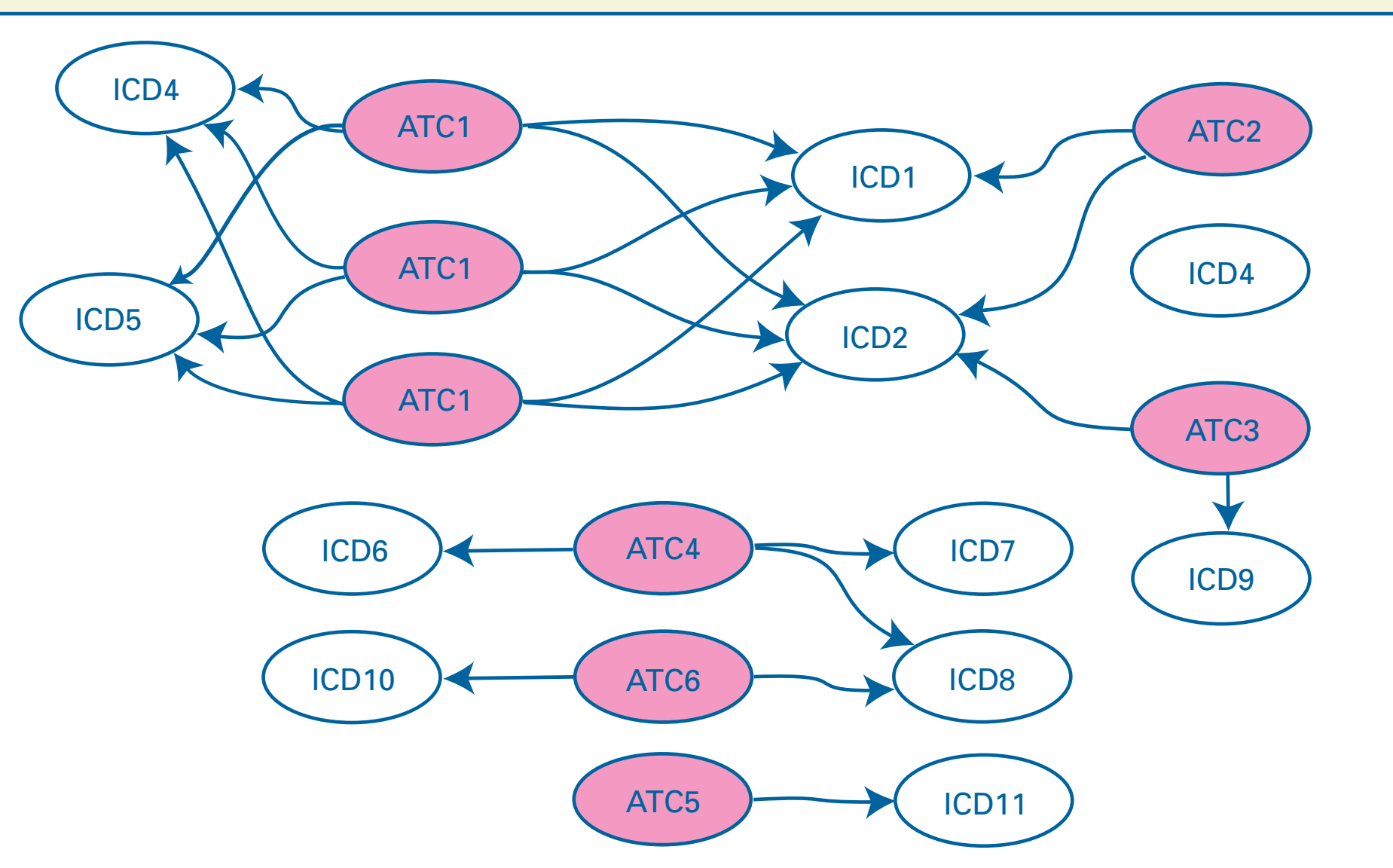

(4) METHODS

Using modern **Open Source technology** like Linux and PostgreSQL, derivating the ICD-code from the ATC-code was designed to be as **scientifically correct** and **comprehensible as possible**. For the assignment of the codes, **ATC-code level 1-3** and **ICD-9-Code** containing digit 1-3 was used.
Base tables were created using age and sex as determinant variables.

The whole process primarily includes joins between the ATC/ICD sources and data from the Austrian Social Security System. The biggest challenges were: multiple assignments leading to huge sets of results data quality and the final aggregation. Base tables were created using age and sex as determinant variables.

ATC/ICD INTEGRATION WORKFLOW (SIMPLIFIED)
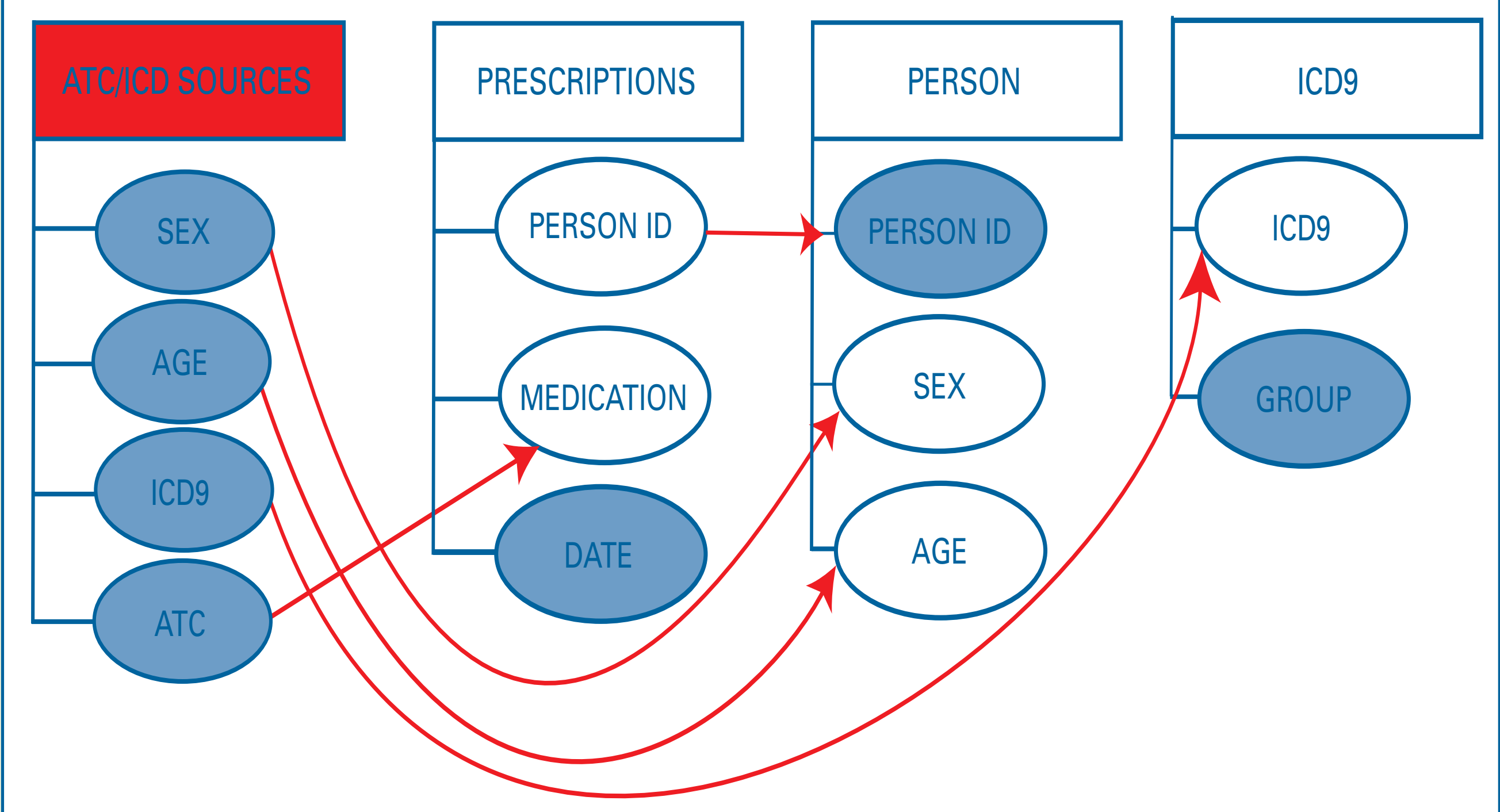
(5) RESULTS

The results are represented by a table holding diagnoses and corresponding dates of patients. This dataset can be understood as a "materialized view" as the whole process does not need any human interaction. From now on it is possible to handle diagnoses gathered by ATC/ICD in a rather simple and reproducible way.
The following table shows an example of the results. The first three columns hold the most relevant information: person, icd9_group and date. The 'count' and 'prob_' columns can be used to estimate the relevance of the match. As the data is highly aggregated and backed by statistics, a meaningful interpretation of these columns is quite difficult and therefore not used (and investigated in the current phase).

PERSON ID	ICD9 GROUP	DATE	COUNT	PROB. SUM	PROB. AVG	PROB. MAX	PROB.MIN
3	530-537	2006-02-01	4	40.976	10.244	20.977	2.629
3	530-537	2006-04-01	4	40.976	10.244	20.977	2.629

(6) CONCLUSIONS

First of all the main conclusion states, that it is **possible to gather diagnoses from prescription** data.
• Further testing,
• improvement of the data quality,
• the creation of sample use-cases and
• a real-life example
will follow and show the validity and potential problems of the overall approach.

So far this method seems promising.

REFERENCES

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TECHNISCHE UNIVERSITÄT WIEN
Vienna University of Technology