



MITIGATING MEDICATION MISHAPS: GOOD CLINICAL PRACTICES FOR LOOK-ALIKE, SOUND-ALIKE DRUG MANAGEMENT

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1- What was done?

Medication errors commonly involve confusion between drug names that look or sound alike. To reduce these mistakes, parts of the names could be printed in "Tall Man" (capital) letters, in order to recognize the distinctions between related products. Tall Man Lettering is a method of adding upper-case lettering to look-alike, sound-alike (LASA) drug names to highlight the similar products. Tall Man Lettering is only one of many risk-limiting strategies to minimize errors involving LASA drug names.

Tall Man Lettering only be used for names that has the greatest risk to patient safety. We go through the risk assessment procedure to identify these names.

| K1 | K2 | M | R | x70 | Güç benzerliği | Uygulama yolu benzerliği | Doz formu benzerliği | Güç / Severity | Benzerlik skorları | Benzerlik numarası | Risk derece |
|------------|------------|--------|--------|--------|----------------|--------------------------|----------------------|----------------|--------------------|--------------------|--------------|
| vectavir | ventavis | Bi-SIM | 0,8125 | 56,875 | 0 | 0 | 0 | major | 56,875 | 4 | High risk |
| fludalt | fludara | Bi-SIM | 0,7857 | 54,999 | 0 | 2,5 | 0 | severe | 57,499 | 4 | High risk |
| bleocin | cleocin | Bi-SIM | 0,7857 | 54,999 | 0 | 2,5 | 0 | severe | 57,499 | 4 | High risk |
| enaxil | eraxis | Bi-SIM | 0,7500 | 52,5 | 0 | 5 | 0 | major | 57,5 | 4 | High risk |
| dacticin | daptocin | Bi-SIM | 0,7500 | 52,5 | 0 | 0 | 5 | severe | 57,5 | 4 | High risk |
| canderel | candexil | Bi-SIM | 0,7500 | 52,5 | 0 | 5 | 0 | Major | 57,5 | 4 | High risk |
| esmobloc | esobloc | Bi-SIM | 0,7500 | 52,5 | 0 | 5 | 0 | severe | 57,5 | 4 | High risk |
| imurax | imuran | Bi-SIM | 0,7500 | 52,5 | 0 | 2,5 | 2,5 | severe | 57,5 | 4 | High risk |
| supradym | suprafen | Bi-SIM | 0,7500 | 52,5 | 0 | 2,5 | 2,5 | severe | 57,5 | 4 | High risk |
| digoxin | divodin | Bi-SIM | 0,7143 | 50,001 | 0 | 5 | 2,5 | severe | 57,501 | 4 | High risk |
| albuman | altuzan | Bi-SIM | 0,7143 | 50,001 | 0 | 5 | 5 | severe | 60,001 | 4 | High risk |
| demoxif | remoxil | Bi-SIM | 0,7143 | 50,001 | 0 | 5 | 5 | severe | 60,001 | 4 | High risk |
| spasmex | spasmomen | Bi-SIM | 0,7222 | 50,554 | 0 | 5 | 5 | Major | 60,554 | 4 | High risk |
| penbisin | penisilin | Bi-SIM | 0,7222 | 50,554 | 0 | 5 | 5 | Severe | 60,554 | 4 | High risk |
| novosef | novoseven | Bi-SIM | 0,7222 | 50,554 | 0 | 5 | 5 | severe | 60,554 | 4 | High risk |
| kardiyomil | kardiyosol | Bi-SIM | 0,8000 | 56 | 0 | 5 | 0 | Severe | 61 | 4 | High risk |
| immunace | immunate | Bi-SIM | 0,8750 | 61,25 | 0 | 0 | 0 | severe | 61,25 | 4 | High risk |
| gliben | glivec | Bi-SIM | 0,7500 | 52,5 | 0 | 5 | 5 | severe | 62,5 | 4 | High risk |
| carbodex | carbomix | Bi-SIM | 0,7500 | 52,5 | 10 | 0 | 0 | severe | 62,5 | 4 | High risk |
| carbodex | casodex | Bi-SIM | 0,7500 | 52,5 | 10 | 0 | 0 | severe | 62,5 | 4 | High risk |
| dopadex | dopadren | Bi-SIM | 0,7500 | 52,5 | 10 | 0 | 0 | major | 62,5 | 4 | High risk |
| polivy | polix | Bi-SIM | 0,7500 | 52,5 | 0 | 5 | 5 | severe | 62,5 | 4 | High risk |
| danasin | darabin | Bi-SIM | 0,7143 | 50,001 | 10 | 0 | 2,5 | Major | 62,501 | 4 | High risk |
| propocia | propycil | Bi-SIM | 0,8125 | 56,875 | 0 | 5 | 5 | moderate | 66,875 | 3 | High risk |
| pental | pentasa | Bi-SIM | 0,7857 | 54,999 | 10 | 2,5 | 0 | moderate | 67,499 | 3 | High risk |
| dexpadu | dexplus | Bi-SIM | 0,7143 | 50,001 | 10 | 5 | 2,5 | Major | 67,501 | 3 | High risk |
| zedprex | zyprexa | Bi-SIM | 0,7143 | 50,001 | 10 | 5 | 2,5 | Moderate | 67,501 | 3 | High risk |
| benvida | bonviva | Bi-SIM | 0,7143 | 50,001 | 10 | 5 | 2,5 | Moderate | 67,501 | 3 | High risk |
| combicid | combivir | Bi-SIM | 0,8125 | 56,875 | 10 | 2,5 | 2,5 | moderate | 71,875 | 3 | High risk |
| mexia | mexil | Bi-SIM | 0,9000 | 63 | 0 | 5 | 5 | moderate | 73 | 3 | High risk |
| ferout | ferrum | Bi-SIM | 0,7500 | 52,5 | 20 | 5 | 2,5 | major | 80 | 2 | Extreme risk |
| dexiren | dexofen | Bi-SIM | 0,7143 | 50,001 | 20 | 5 | 5 | Minor | 80,001 | 2 | High risk |

Table 1 : Levensthein algorithm scoring

2- Why was done?

Drug name confusion because of look-alike/sound-alike (LASA) named medicines can be a factor of the medication related adverse events. LASA are defined that have the same appearance or similar sounds when written or spoken. They may be confused by healthcare professionals and lead to medication errors that may harm the patient.

Tall Man Lettering made similar names easier to distinguish and alert the healthcare providers to be more careful about the medication confusion. Tall Man Lettering spelling of LASA drug names may help to make a general awareness of potential drug name confusion.

3- How it was done?

* Assesment of the likelihood of confusion between two products according to;

- Similarity of strengths,
- Similarity between the names,
- Similar dose forms of products,
- Similar routes of administration.

Likelihood of confusion is calculated by a score out of 100. The scores were found by adding (sum) of the orthographic similarity score, strength similarity, route similarity and dose form similarity.

Total score consists name similarity over 70, strength similarity over 20, route similarity over 5, dose form similarity over 5. An algorithm using Bigram Similarity (BI-SIM) was used to calculate the orthographic and/or phonetic similarities of drug names in the hospital's formulary. 9253 drug names were evaluated. Enteral nutrition, cosmetics and food supplements were excluded from the list. The remaining 5.214 drug names were scored according to the BI-SIM algorithm. 345 drug pairs with a similarity ratio of 0.5 and above were included in the study. The clinical risks of these drugs (route of administration, potency, pharmaceutical dosage form similarities) were scored and summed by BI-SIM similarity scores.

| Scoring | |
|---|-------------------|
| Name similarity: | BI-SIM score x 70 |
| Strength similarity: | |
| No common strength | 0 |
| Some (but not all) strengths in common | 10 |
| All strengths in common | 20 |
| Route similarity: | |
| No common administration route | 0 |
| Some (but not all) routes in common | 2.5 |
| All routes in common | 5 |
| Dose form similarity: | |
| No common dose forms | 0 |
| Some (but not all) dose forms in common | 2.5 |
| All dose forms in common | 5 |
| | Max 100 |

Picture 1: Scoring parameters

• Combination of likelihood of confusion between two products and consequence of the confusion on a risk matrix

- Finally, the total similarity scores of the drug pairs were placed in the risk matrix of the degree of harm it would cause to the patient in case of a medication error. A list of 30 pairs of high and very high risk drugs was created. The medications on the list were written using the mid Tall Man font and labeled with cautionary labels.

| Likelihood of Similarity | Potential Severity | | | | |
|--------------------------|--------------------|-------|----------|-------|--------|
| | Minimum | Minor | Moderate | Major | Severe |
| 1 | M | H | E | E | E |
| 2 | M | H | H | E | E |
| 3 | L | M | H | H | E |
| 4 | L | M | M | H | H |
| 5 | L | L | L | M | M |

Key: E - Extreme risk | H - High risk | M - Moderate risk | L - low risk

Picture 2: Risk Matrix table

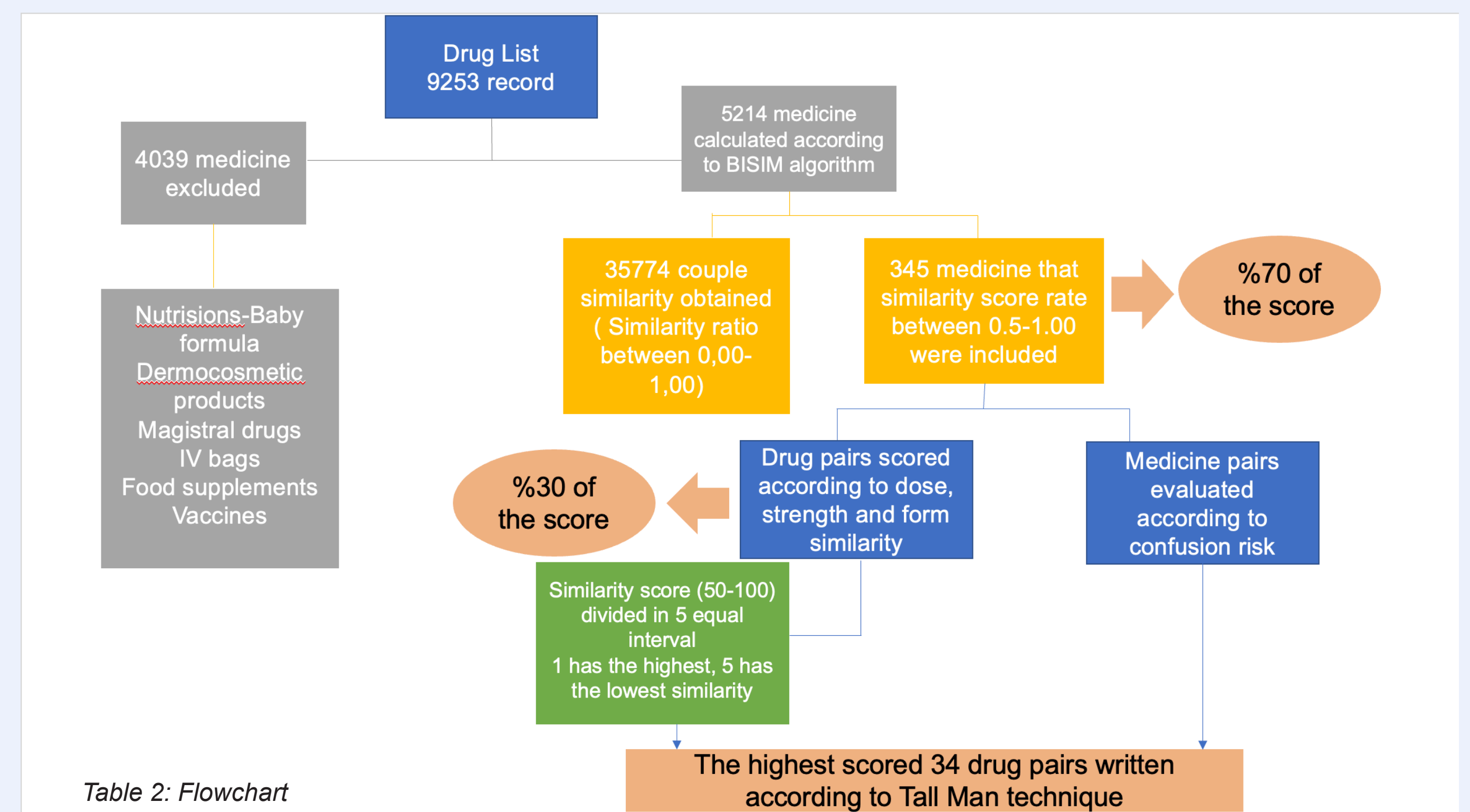
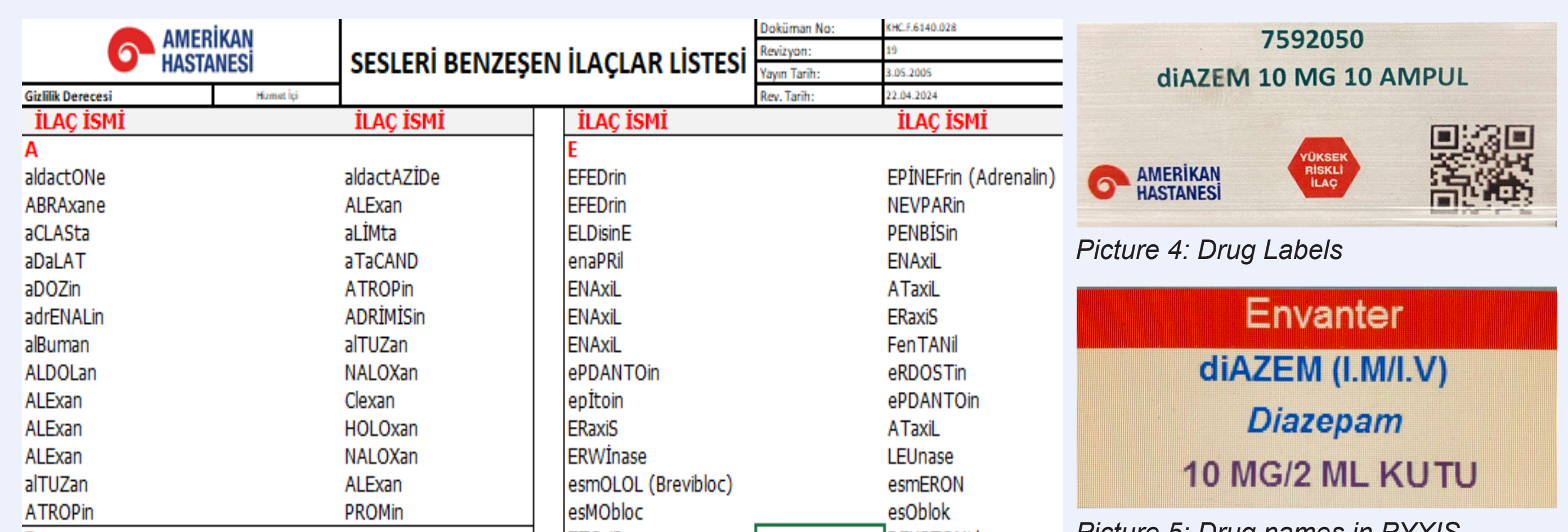


Table 2: Flowchart

4- What was achieved?

- We minimize the risk of errors caused by selecting the wrong medication. Our goal is to eliminate major medication errors caused by the incorrect spelling of drug names.



Picture 3: List of drugs written with Tall Man Letter



Picture 5: Drug names in PYXIS

5- What is next?

Risk of a drug name confusion is complex, involves many potential contributing factors and is unlikely to be resolved with a single approach.

Some of the pairs were excluded due to the names not sharing adequate orthographic similarity to warrant the use of Tall Man Lettering. Generally, this was considered to be the case if Tall Man names did not contain at least two lowercase letters. While this pair of medicines has caused confusion and patient harm, use of Tall Man Lettering, is unlikely to considerably reduce name confusability. For these medicines, confusion likely arises from the fact that the two products are different formulations of the same active ingredient. Other interventions should be made to reduce harm from such confusable products.

Ref: (1) Tall men lettering list report. (2013, December). hgsc.govt.nz. <https://www.hgsc.govt.nz/assets/Our-work/System-safety/Reducing-harm/Medicines/Publications-resources/Tall-Man-report-Dec-2013.PDF> (2) Institute for Safe Medication Practices Canada. (2016). Drug labelling and the application of Tall Man lettering. <https://www.ismp-canada.org/download/Tall-Man/Tall-Man-Lettering-ProjectReport.pdf>

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