Patient Safety Metric Development Utilizing Electronic Medical Records Data in Diabetes Patients.

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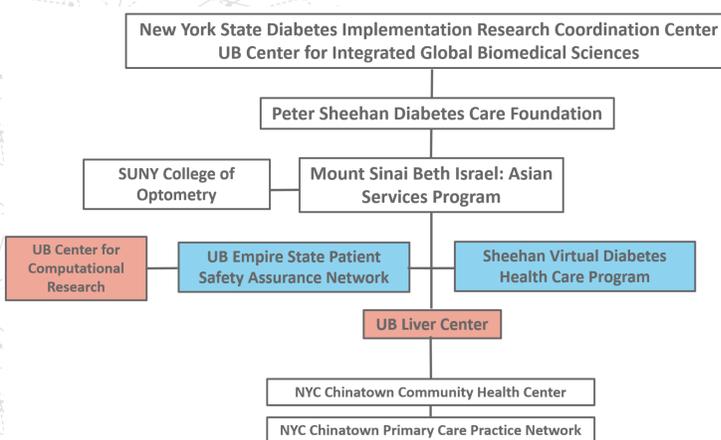
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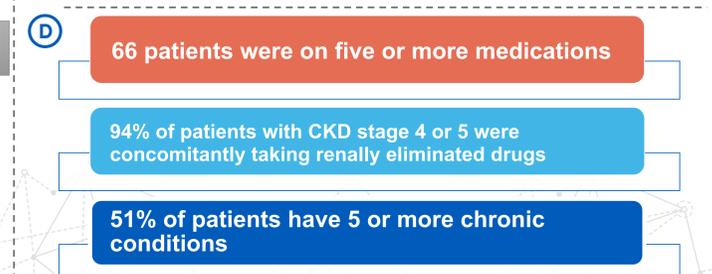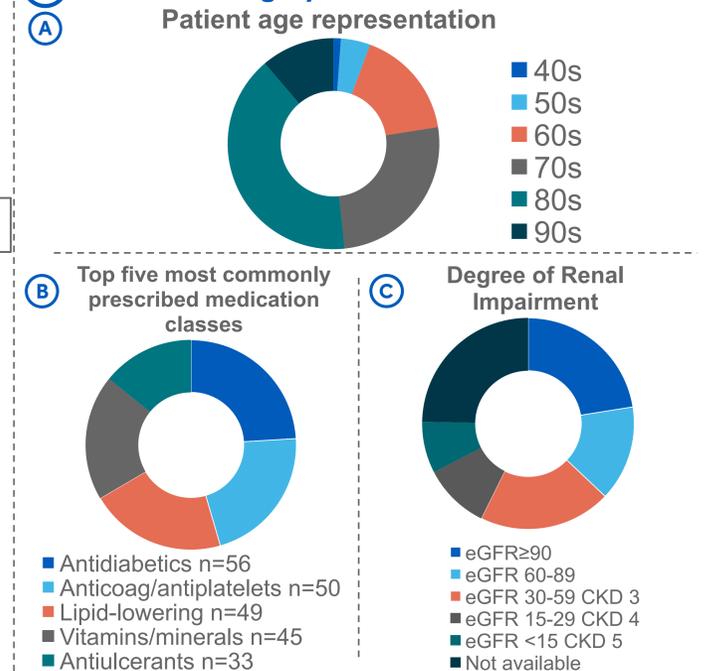
Background

- Collaborative efforts such as those developed between the University at Buffalo (UB), Mount Sinai Beth Israel Hospital in NYC, and the Peter Sheehan Diabetes Care Foundation are aimed at novel approaches to collect and analyze de-identified patient data. *(Figure 1.)*
- Pharmacists and other health care professionals are uniquely positioned to monitor safety and risk through a centralized database from de-identified Electronic Medical Record (EMR) sources.
- The present study examined the development of a patient safety metric aimed at improving centralized review, as well as its utility for at risk populations.
- Asian populations are an example of such at risk populations. Exhibiting important pharmacogenomic differences that influence pharmacokinetics and pharmacodynamics that may effect patient safety.

① *Project organization*

Methods

- N=89 diabetic adults aged (48-94 years) were retrospectively reviewed utilizing collaborative de-identified data from the MSBI Hospital EMR and transfer to a database at UB for analysis. (Figure 2).
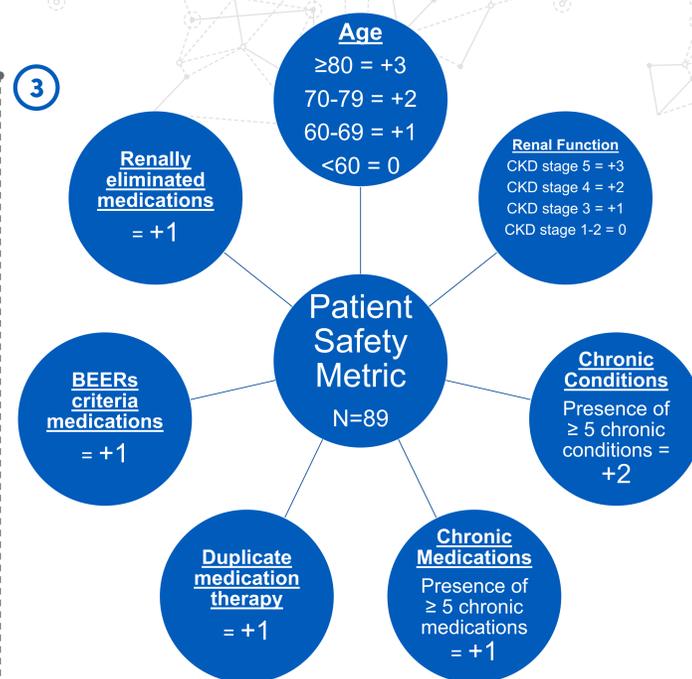
- A novel approach to de-identifying patient data provided EMR data consisting of age, allergies, ICD 10 codes, discharge medications/diagnosis, the use of traditional Chinese medicines (TCM) and lab values.
- The constructed patient safety metric takes into account seven areas of safety/risk age *(Figure 3)*. Upon organizing the two-year EMR data set, patient data was scored utilizing the developed patient safety metric on a scale of 0-12 (lowest to highest patient safety risk). Following scoring of all the patients the analysis of metric scores using statistical measures of central tendency was completed and graphically depicted.

② *Patient Demographics*

Ⓐ **Patient age representation**

- 40s
- 50s
- 60s
- 70s
- 80s
- 90s

Ⓑ **Top five most commonly prescribed medication classes**

- Antidiabetics n=56
- Anticoag/antiplatelets n=50
- Lipid-lowering n=49
- Vitamins/minerals n=45
- Antiulcerants n=33

Ⓒ **Degree of Renal Impairment**

- eGFR≥90
- eGFR 60-89
- eGFR 30-59 CKD 3
- eGFR 15-29 CKD 4
- eGFR <15 CKD 5
- Not available

Ⓓ
- **66 patients were on five or more medications**
- **94% of patients with CKD stage 4 or 5 were concomitantly taking renally eliminated drugs**
- **51% of patients have 5 or more chronic conditions**

③

Age
≥80 = +3
70-79 = +2
60-69 = +1
<60 = 0

Renal Function
CKD stage 5 = +3
CKD stage 4 = +2
CKD stage 3 = +1
CKD stage 1-2 = 0

Renally eliminated medications = +1

Chronic Conditions Presence of ≥ 5 chronic conditions = +2

BEERs criteria medications = +1

Patient Safety Metric N=89

Chronic Medications Presence of ≥ 5 chronic medications = +1

Duplicate medication therapy = +1

Results

- Primary objectives of creating a patient safety metric were achieved given specifics found in methods. Secondary objectives of gathering and interpreting data were also achieved.
- *Table 4* displays a principle metric scores summary given the specifics found in the methods; data was found to be normally distributed.
- In the continual analysis of metric data, *figure 5* represents a correlation between an increased number of discharge medications and a higher metric score.
- The safety metric allows for the entry of objective data, negatives to this being its inability to produce a score when vital pieces of EMR data are absent.

④

Patient Safety Metric Data

Number of patients (N)	89
Mean (average score)	6.12
Median score	6
Range of scores	0-12

⑤

Metric Score vs. Number of Medications
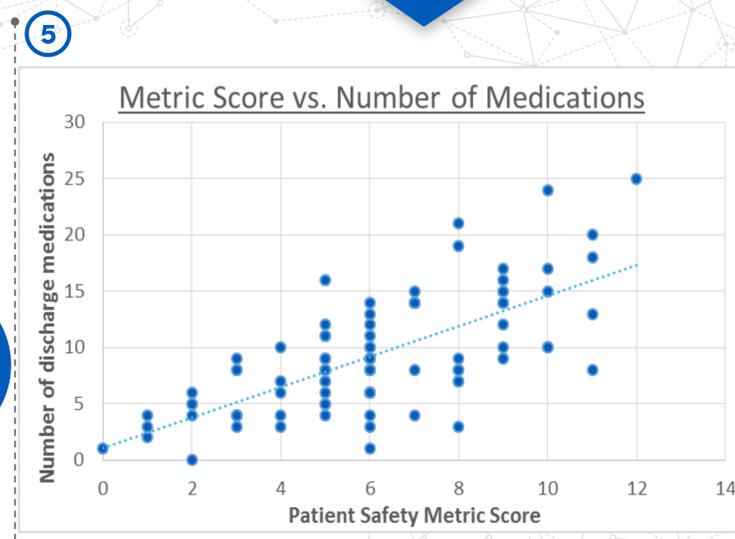
Conclusion

- The organization of EMR data into a patient safety metric may prove to be advantageous in the approach to diabetes patient care as well as the development of specifics to look for when initiating care.
- Findings displaying a wide range of scores indicate not only the variation in types of patients studied but also the potential for the metric as a tool to categorize patients into low or high risk pools.
- The future usability of this metric is aimed at targeting health professionals who are caring for diabetes patients, while further testing it's potential to develop scores even in varying patient populations.
- Its implications on flagging high risk patients allows for closer monitoring with the ultimate goal of adverse event prevention to promote patient safety.

References

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