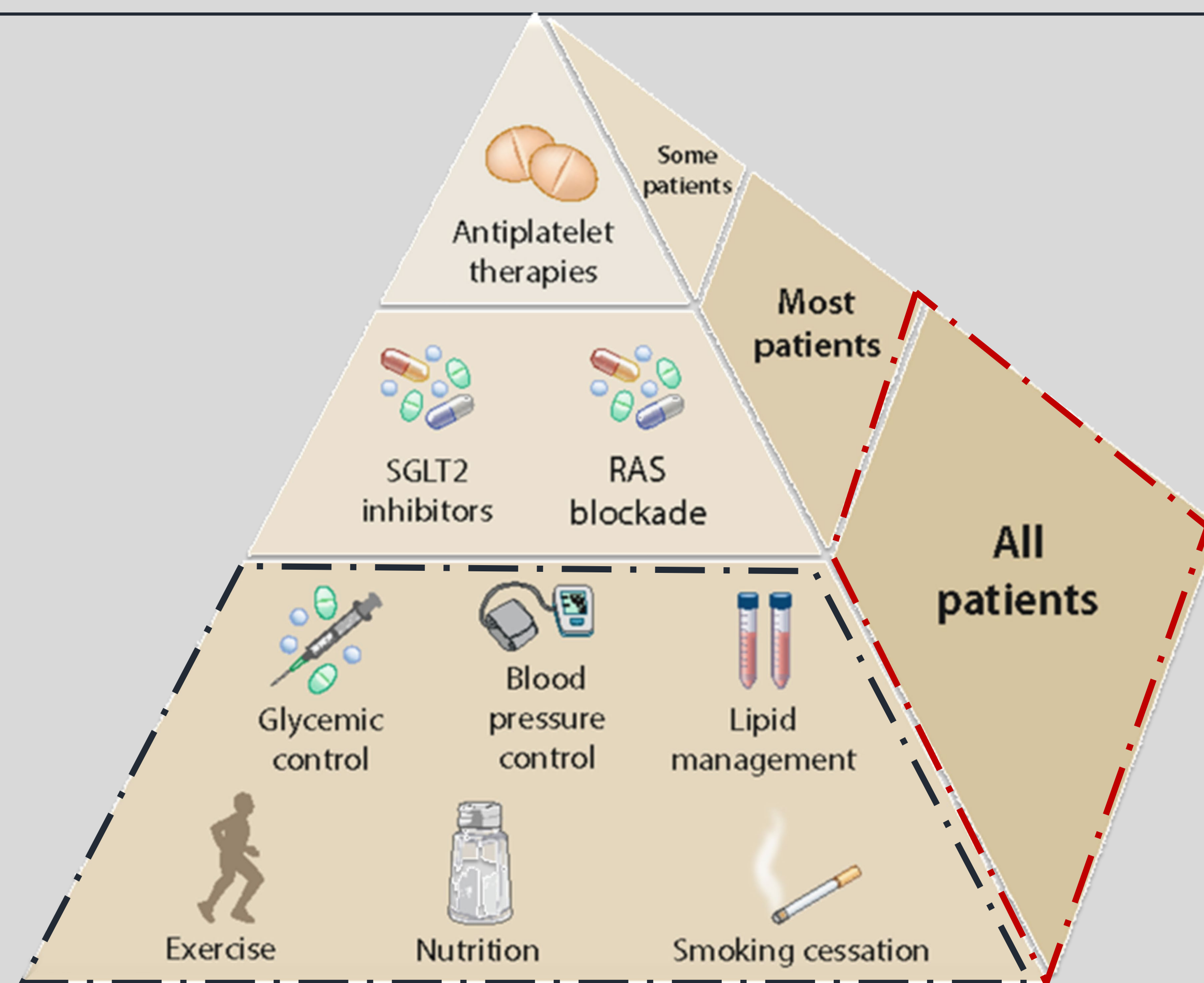# PNRG: Knowledge graph-driven methodology for Personalized Nutritional Recommendation Generation

Introduction

- <u>Chronic kidney disease</u>, also known as chronic renal disease or CKD, is a condition characterized by a gradual loss of kidney function over time.

- Leads to
  - Kidney damage
  - Decreased waste filtering from blood.
  - If kidney disease worsens, wastes can build to high levels in blood, causing further complications.

- Chronic kidney disease is a <u>progressive</u> condition that affects <u>>10%</u> of the general population worldwide, amounting to <u>>800 million</u> individuals.

Lifestyle Features for Interventions control

- Medication reminders
- Nutritional guidance
- Drug interactions
- CKD stage calculation
- A log of medical tests and food.
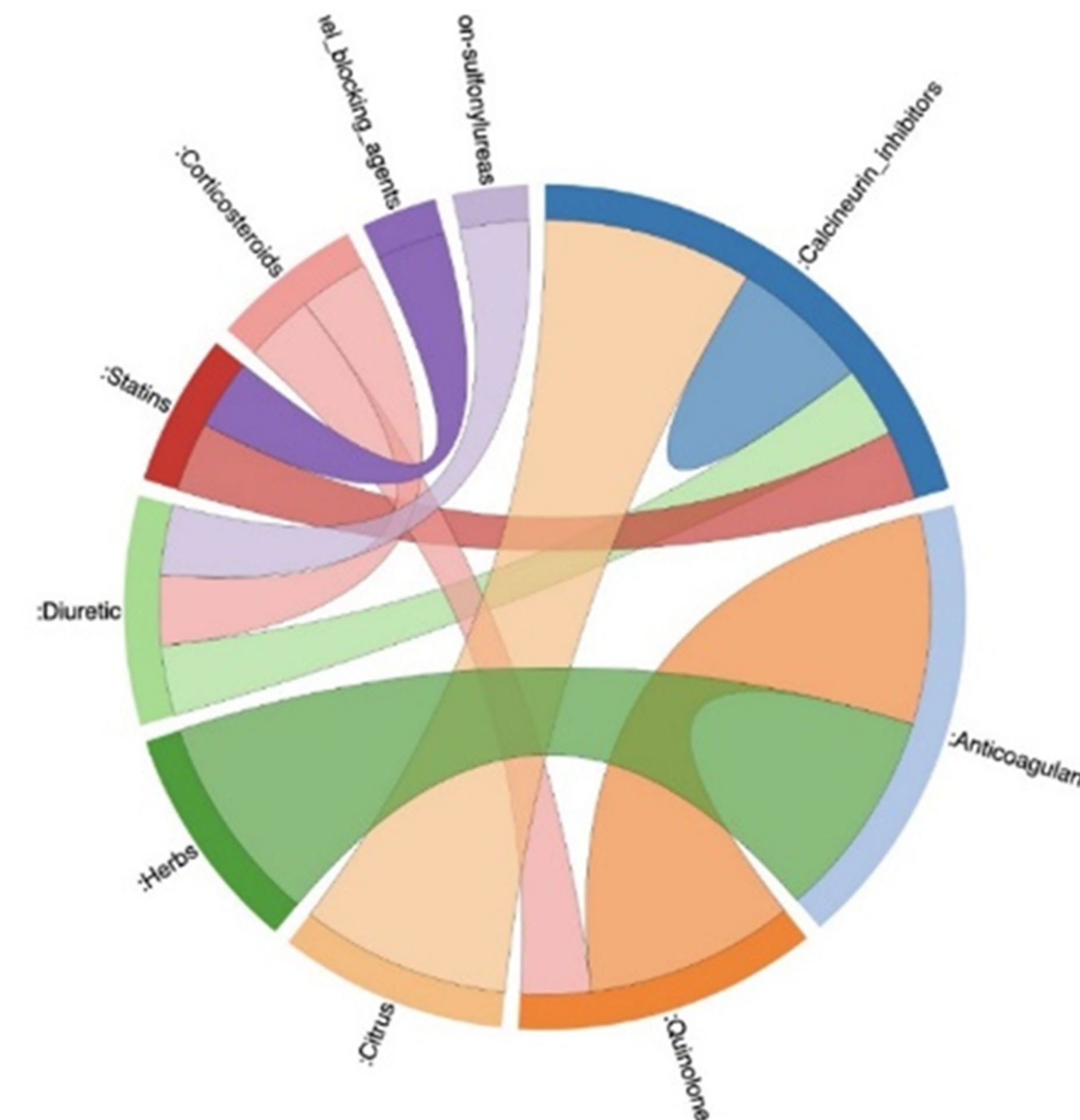

Knowledge Graph Driven Methodology
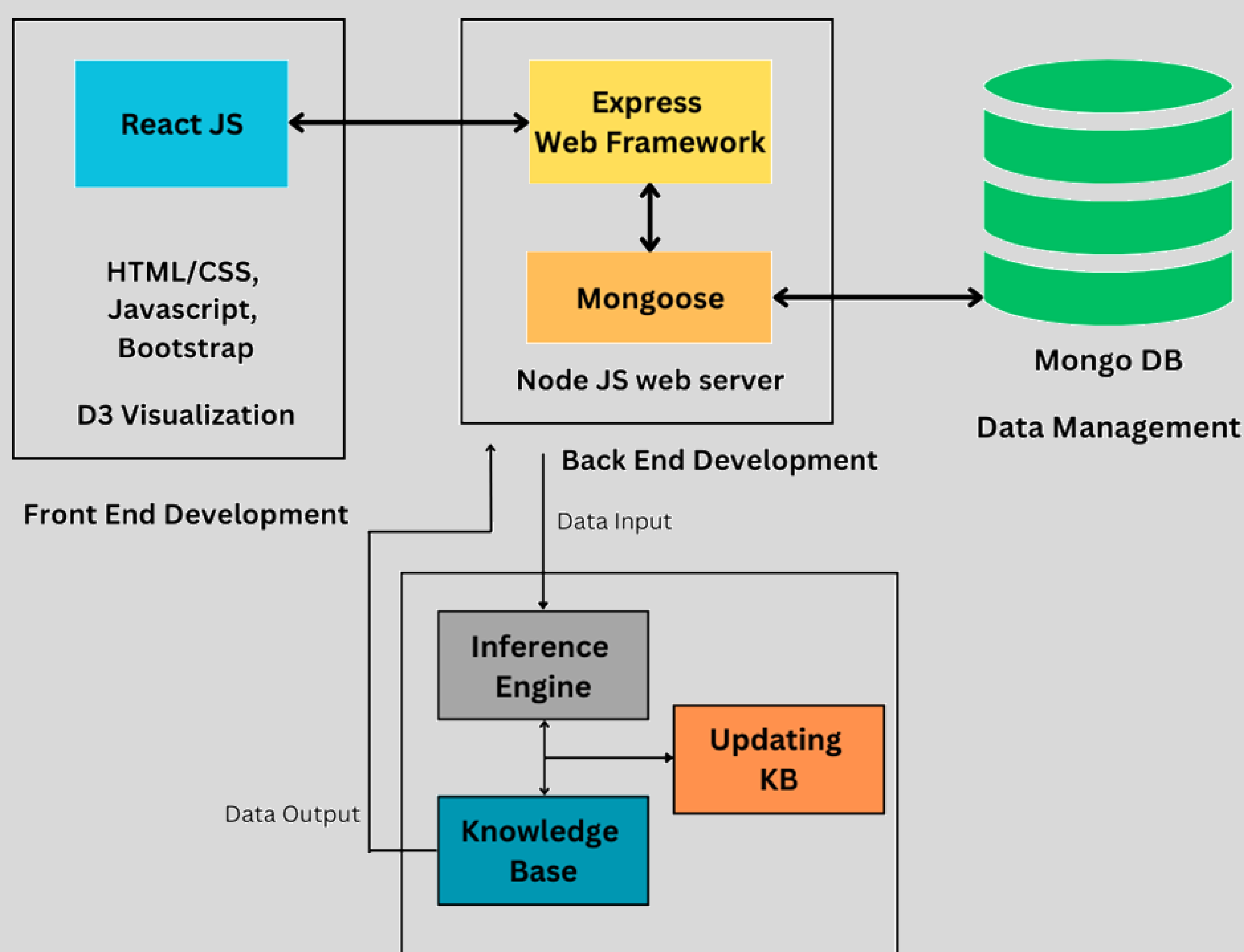
Showing the dependencies between 10 classes

| Class	Links
:Calcineurin_inhibitors	16
:Anticoagulant	12
:Quinolone	8
:Citrus	6
:Herbs	6
:Diuretic	6
:Statins	4
:Corticosteroids	4
:Calcium_channel_blocking_agents	2
:Non-sulfonylureas	2
:Sulfonamides	2

Evaluation & Result

- Positive feedback of application from people that used the application.
- Positive feedback from medical professionals regarding the effectiveness of the application.

Points	Min	Max	Average
User Friendliness	7	10	8.6
Effect on general lifestyle	7	10	8.3
How likely to keep using the app	8	10	8.4
Recommend to a friend	8	10	8.3

Subject	Age	Gender	Height (cm)	Weight (kg)	CKD Stage
S1	24	Male	182	74	3B
S2	29	Female	162	59	2
S3	61	Male	177	95	4
S4	37	Male	179	84	3A
S5	57	Female	160	82	2
S6	49	Male	170	70	3A
S7	55	Female	158	70	4
S8	72	Male	174	80	3B
S9	42	Male	176	70	1
S10	66	Female	163	72	2

User Level Satisfaction
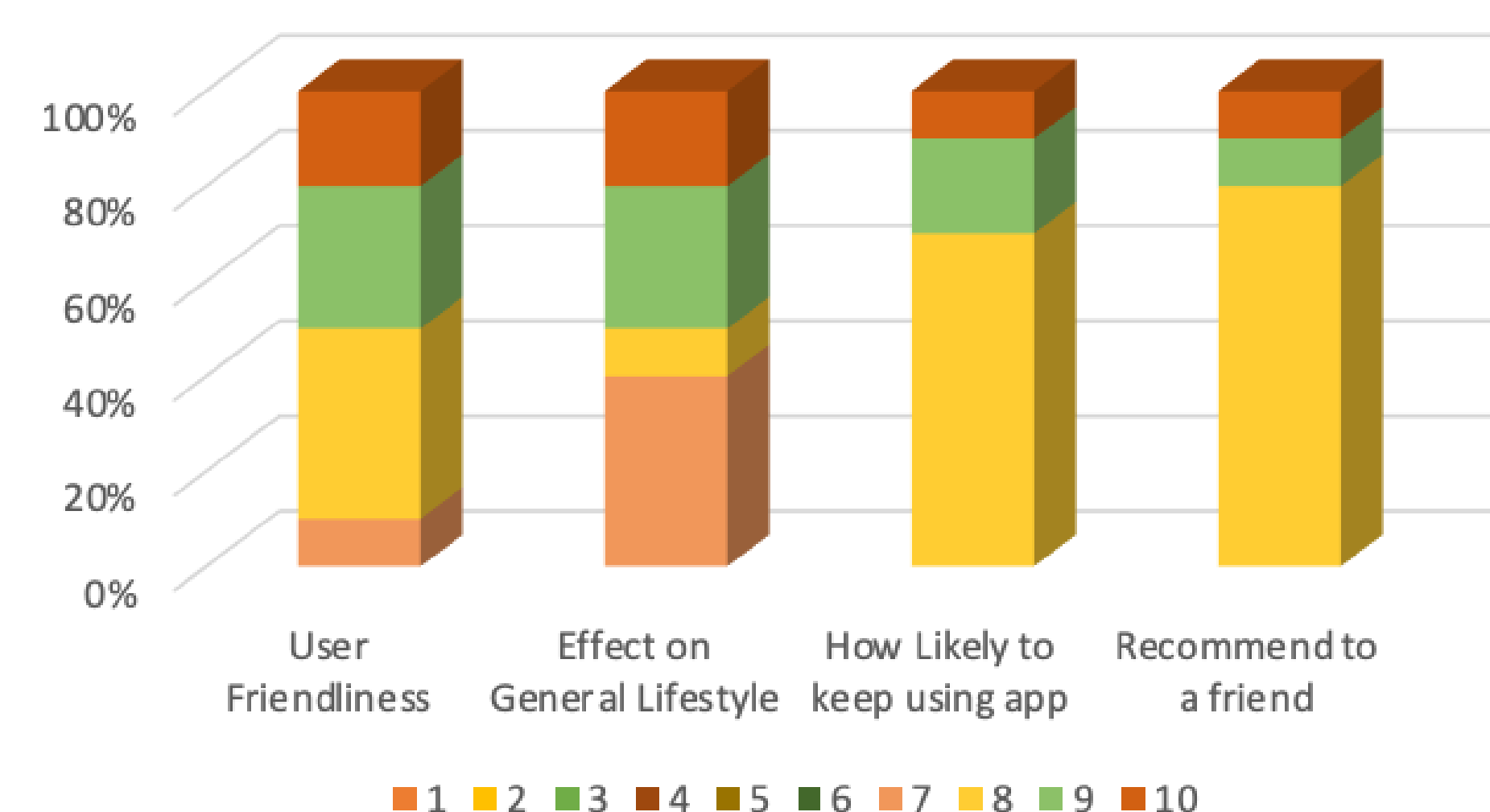
Conclusion

- By leveraging the power of knowledge graphs to integrate and analyze complex data, our approach can generate highly personalized recommendations that are both effective and sustainable.
- Research findings suggest that personalized recommendations can significantly improve patient outcomes and reduce the progression of CKD.

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