

SUPPLEMENTARY DATA

Supplementary Table A.1. Feature weights used to calculate similarity between patient visits (Darker shading indicates larger values)

Feature	NEW PT	NORX	MET0	ORAL0	INS0	MET1	MET INS0	INS1	ORAL 1	MET2	MET INS1	INS2	MUL TI
Male sex	0.01	0.01	<0.01	0.01	0.01	<0.01	0.01	0.01	0.03	0.01	<0.01	<0.01	0.01
Black race/ethnicity	0.0	0.01	<0.01	<0.01	0.01	0.01	0.01	0.02	0.01	<0.01	0.03	0.10	<0.01
Hispanic race/ethnicity	0.01	0.01	<0.01	0.01	0.01	0.01	0.01	0.02	<0.01	<0.01	0.02	0.07	<0.01
White race/ethnicity	<0.01	0.01	<0.01	0.02	0.02	<0.01	0.01	0.01	<0.01	0.01	0.04	0.08	0.02
Age	<0.01	<0.01	0.01	0.01	0.03	0.04	0.02	0.01	0.03	0.01	0.02	0.04	<0.01
Time since first diabetes treatment	0.07	0.03	0.03	0.04	0.01	0.02	0.03	0.03	0.03	0.01	0.02	0.02	<0.01
Most recent HbA1c	0.21	0.31	0.22	0.24	0.25	0.17	0.31	0.15	0.11	0.09	0.14	0.05	0.07
Frequency of HbA1c measurements	0.02	0.01	0.01	0.02	0.02	0.02	0.03	0.02	0.01	<0.01	0.02	0.01	0.01
Second most recent HbA1c	0.01	0.07	0.01	0.01	0.04	0.01	0.02	0.01	0.02	0.04	<0.01	0.01	0.01
Median HbA1c (last 1000 days)	0.05	0.11	0.02	0.07	0.01	0.08	<0.01	0.04	0.08	0.09	0.04	0.08	0.10
75th percentile HbA1c (last 1000 days)	<0.01	0.12	0.10	0.09	0.07	0.07	0.07	0.02	0.13	0.13	0.06	0.02	0.05
25th percentile HbA1c (last 1000 days)	0.06	0.09	0.04	0.02	0.03	0.03	0.08	<0.01	0.18	0.14	0.07	0.01	0.06
Mean HbA1c (last 1000 days)	0.18	0.04	0.06	0.04	0.07	0.07	0.01	0.09	0.08	0.22	0.03	0.04	0.15
Most recent BMI	0.03	0.07	0.05	0.04	0.01	0.05	<0.01	0.01	0.03	0.03	0.01	0.02	0.03
Median BMI (last 1000 days)	0.04	<0.01	0.07	0.02	0.04	0.03	0.04	0.03	<0.01	0.04	0.04	0.04	0.08

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75th percentile BMI (last 1000 days)	0.07	0.03	0.04	0.01	0.05	0.05	0.02	0.08	<0.01	0.01	0.13	0.03	0.01
25th percentile BMI (last 1000 days)	0.09	0.01	0.03	0.04	0.03	0.05	0.03	0.14	0.07	0.02	0.05	0.06	0.09
Mean BMI (last 1000 days)	0.14	0.03	0.11	0.07	0.01	0.08	0.01	0.17	0.11	0.05	0.21	0.14	0.20
Ever prescribed metformin previously	<0.01	<0.01	<0.01	0.02	0.01	<0.01	0.01	0.02	<0.01	<0.01	0.01	0.02	0.01
Serum creatinine level \geq 1.5 mg/dL	<0.01	0.01	0.01	0.01	0.02	<0.01	0.01	0.01	<0.01	<0.01	0.02	0.01	0.01
Number of lines of therapy tried	<0.01	0.01	0.01	0.02	0.03	0.03	0.06	0.01	0.01	0.02	0.01	0.06	0.02
Number of visits since starting current line of therapy	<0.01	<0.01	0.01	0.02	0.01	0.02	0.02	0.02	0.01	0.03	0.03	0.05	0.05
Patient currently prescribed metformin	<0.01	0.02	0.04	0.05	0.12	0.04	0.03	0.03	0.01	0.01	0.01	0.01	0.01
Patient currently prescribed insulin	<0.01	<0.01	0.11	0.01	0.05	0.06	0.05	0.01	0.05	0.03	0.01	0.04	<0.01
Number of unique drugs in current regimen	<0.01	0.01	0.01	0.10	0.04	0.07	0.11	0.05	<0.01	<0.01	0.01	0.01	0.01

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Supplementary Table A.2. Out-of-sample R² under various predictive methods

Regimen	kNN	LASSO	Random Forest
NEWPT	0.38	0.33	0.41
MET0	0.46	0.42	0.48
ORALO	0.40	0.39	0.40
INS0	0.54	0.53	0.53
MET1	0.42	0.39	0.42
INS1	0.44	0.43	0.43
METINS0	0.46	0.46	0.47
ORAL1	0.34	0.35	0.35
MET2	0.32	0.32	0.33
INS2	0.20	0.31	0.24
METINS1	0.41	0.42	0.45
MULTI	0.46	0.36	0.46

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Supplementary Table A.3. Performance of algorithm in study subgroups

All patient visits						
<i>Subgroup</i>	<i>Number of visits</i>	<i>HbA1c benefit relative to standard of care</i>				
		<i>Mean (%)</i>	<i>SE (%)</i>	<i>Mean (mmol/mol)</i>	<i>SE (mmol/mol)</i>	
Male	20,231	-0.14%	0.01%	-1.5	0.1	
Female	27,909	-0.14%	0.01%	-1.5	0.1	
Black	29,120	-0.14%	0.01%	-1.5	0.1	
White	7,444	-0.09%	0.01%	-1.0	0.1	
Hispanic	6,732	-0.22%	0.01%	-2.4	0.1	
Other	4,844	-0.11%	0.01%	-1.2	0.1	
Age <60	23,705	-0.20%	0.01%	-2.2	0.1	
Age 60+	24,435	-0.08%	0.00%	-0.9	0.0	
Good glycemic control (HbA1c ≤7)	18,156	-0.05%	0.01%	-0.4	0.1	
Poor glycemic control (HbA1c >7)	29,984	-0.20%	0.00%	-2.2	0.0	
Visits for which algorithm's recommendation differed from standard of care						
<i>Subgroup</i>	<i>Number of visits</i>	<i>Percent of all visits in subgroup</i>	<i>HbA1c benefit relative to standard of care</i>			
			<i>Mean (%)</i>	<i>SE (%)</i>	<i>Mean (mmol/mol)</i>	<i>SE (mmol/mol)</i>
Male	6,363	31.5%	-0.44%	0.02%	-4.8	0.2
Female	8,960	32.1%	-0.44%	0.02%	-4.8	0.2
Black	9,103	31.3%	-0.45%	0.02%	-4.9	0.2
White	2,309	31.0%	-0.29%	0.03%	-3.2	0.3
Hispanic	2,400	35.7%	-0.61%	0.03%	-6.7	0.3

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Other	1,511	31.2%	-0.34%	0.04%	-3.7	0.4
Age <60	8,783	37.1%	-0.55%	0.02%	-6.0	0.2
Age 60+	6,540	26.8%	-0.30%	0.02%	-3.3	0.2
Good glycemic control (HbA1c ≤7)	4,438	24.4%	-0.20%	0.02%	-2.2	0.2
Poor glycemic control (HbA1c > 7)	10,885	36.3%	-0.54%	0.02%	-5.9	0.2

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Supplementary Figure A.1. Treatment history for a sample patient

The black points connected by black lines in the lower portion of the figure depict the HbA1c measurements over time for an example patient. The dotted horizontal black line shows a desired HbA1c threshold of 7%. The history of prescriptions this patient has received for each of three drugs, insulin, metformin, and sulfonylureas, is shown in red, green, and blue, respectively. The start and end of each line of treatment is indicated by a vertical tick mark. Finally, above the phase descriptions are small black dots indicating the date of each patient visit.

