

# THE LANCET

## Diabetes & Endocrinology

### Supplementary appendix

This appendix formed part of the original submission and has been peer reviewed. We post it as supplied by the authors.

Supplement to: Misra S, Barron E, Vamos E, et al. Temporal trends in emergency admissions for diabetic ketoacidosis in people with diabetes in England before and during the COVID-19 pandemic: a population-based study. *Lancet Diabetes Endocrinol* 2021; published online Sept 2. [http://dx.doi.org/10.1016/S2213-8587\(21\)00208-4](http://dx.doi.org/10.1016/S2213-8587(21)00208-4).

## Supplementary Data

Supplementary table 1: Number of individuals with DKA during the first wave, post first wave and second wave and the mean number of individuals in equivalent time periods in 2017-20

	Number of individuals	Number of individuals with more than one admission	%	95% CI lower	95% CI upper
Mar-Jun 2020	7,474	693	9%	9%	10%
Mar-Jun 2017-19	6,777	773	11%	11%	12%
Jul-Oct 2020	7,504	758	10%	9%	11%
Jul-Oct 2017-19	6,909	819	12%	11%	13%
Nov-Feb 2021	8,926	780	9%	8%	9%
Nov-Feb 2017-20	8,117	932	11%	11%	12%

Supplementary Table 2: Number of admissions with DKA during the first wave, post first wave and second wave with a COVID-19 diagnosis

	Number of admissions	COVID-19 diagnosis	%
First wave (total)	8,553	1,007	12%
Type 1	4,041	242	6%
Type 2	2,831	644	23%
Newly diagnosed	1,681	121	7%
Post first wave (total)	8,729	391	4%
Type 1	4,491	120	3%
Type 2	2,613	231	9%
Newly diagnosed	1,625	40	2%
Second wave (total)	10,235	2,405	23%
Type 1	4,337	522	12%
Type 2	3,912	1,574	40%
Newly diagnosed	1,986	309	16%

Supplementary table 3: Median age (and interquartile range) for admissions with DKA during the first wave, post first wave and second wave and equivalent time periods in 2017-20

	Type 1	Type 2	Newly diagnosed
Mar-June 2020	34 (24-52)	64 (52-76)	30 (13-51)
Mar-Jun 2017-19	30 (21-48)	64 (51-76)	27 (13-49)
Jul-Oct 2020	33 (23-51)	64 (53-75)	24 (11-47)
Jul-Oct 2017-19	30 (21-48)	63 (51-76)	23 (11-47)
Nov 2020-Feb 2021	33 (23-52)	63 (53-75)	31 (13-52)
Nov-Feb 2017-20	31 (22-49)	64 (53-77)	26 (12-49)

Supplementary table 4: Demographic characteristics for emergency admissions coded with DKA during March to June 2020 (the first wave), July to October 2020 (post-first wave), November 2020 to February 2021 (second wave) and the mean of equivalent time periods in 2017-2020.

	Mar-Jun 2017-19			Mar-Jun 2020			Jul-Oct 2017-19			Jul-Oct 2020			Nov-Feb 2017-20			Nov-Feb 2020-21		
	Type 1	Type 2	New	Type 1	Type 2	New	Type 1	Type 2	New	Type 1	Type 2	New	Type 1	Type 2	New	Type 1	Type 2	New
Total	4,965	2,010	1,072	4,041	2,831	1,681	5,208	2,011	1,041	4,491	2,613	1,625	5,769	2,608	1,234	4,337	3,912	1,986
Male	2,419	1,078	630	2,039	1,609	1,070	2,527	1,072	610	2,199	1,437	953	2,816	1,392	726	2,167	2,222	1,253
	49%	54%	59%	50%	57%	64%	49%	53%	59%	49%	55%	59%	49%	53%	59%	50%	57%	63%
Female	2,546	933	442	2,001	1,220	611	2,680	938	431	2,287	1,173	668	2,952	1,215	507	2,168	1,684	730
	51%	46%	41%	50%	43%	36%	51%	47%	41%	51%	45%	41%	51%	47%	41%	50%	43%	37%
Unknown	0	1	0	1	2	0	1	0	0	5	3	4	1	0	0	6	2	31
	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%
<19	683	9	371	429	6	554	715	8	409	555	3	667	784	9	451	529	5	628
	14%	0%	35%	11%	0%	33%	14%	0%	39%	12%	0%	41%	14%	0%	37%	12%	0%	32%
19-29	1,726	66	175	1,232	46	240	1,800	79	170	1,440	45	230	1,876	66	188	1,336	58	287
	35%	3%	16%	30%	2%	14%	35%	4%	16%	32%	2%	14%	33%	3%	15%	31%	1%	14%
30-39	828	106	104	717	127	188	876	111	99	746	100	165	998	114	121	740	189	218
	17%	5%	10%	18%	4%	11%	17%	6%	10%	17%	4%	10%	17%	4%	10%	17%	5%	11%
40-49	586	251	113	527	333	184	585	246	93	583	313	158	710	325	113	530	462	227
	12%	12%	11%	13%	12%	11%	11%	12%	9%	13%	12%	10%	12%	12%	9%	12%	12%	11%
50-59	468	398	114	463	639	221	524	395	97	482	550	182	603	532	125	493	861	249
	9%	20%	11%	11%	23%	13%	10%	20%	9%	11%	21%	11%	10%	20%	10%	11%	22%	13%
60-69	280	405	76	267	594	124	289	408	65	281	603	84	339	540	82	315	933	177
	6%	20%	7%	7%	21%	7%	6%	20%	6%	6%	23%	5%	6%	21%	7%	7%	24%	9%
70+	392	775	61	406	1,086	99	418	763	53	404	999	79	457	1,019	81	394	1,404	106
	8%	39%	6%	10%	38%	6%	8%	38%	5%	9%	38%	5%	8%	39%	7%	9%	36%	5%
unknown	1	1	58	0	0	71	1	1	57	0	0	60	1	3	73	0	0	94
	0%	0%	5%	0%	0%	4%	0%	0%	5%	0%	0%	4%	0%	0%	6%	0%	0%	5%
White	4,278	1,567	717	3,425	2,033	1,018	4,495	1,562	689	3,840	1,966	1,002	4,964	2,041	849	3,646	2,711	1,196

	Mar-Jun 2017-19			Mar-Jun 2020			Jul-Oct 2017-19			Jul-Oct 2020			Nov-Feb 2017-20			Nov-Feb 2020-21		
	Type 1	Type 2	New	Type 1	Type 2	New	Type 1	Type 2	New	Type 1	Type 2	New	Type 1	Type 2	New	Type 1	Type 2	New
non-white	86%	78%	67%	85%	72%	61%	86%	78%	66%	86%	75%	62%	86%	78%	69%	84%	69%	60%
	428	290	208	386	535	394	439	293	219	378	399	375	477	356	240	443	801	463
unknown	9%	14%	19%	10%	19%	23%	8%	15%	21%	8%	15%	23%	8%	14%	19%	10%	20%	23%
	259	153	147	230	263	269	274	156	134	273	248	248	328	211	145	248	400	327
	5%	8%	14%	6%	9%	16%	5%	8%	13%	6%	9%	15%	6%	8%	12%	6%	10%	16%
IMD 1 (most deprived)	1,683	605	272	1,416	816	443	1,726	632	263	1,546	781	416	1,915	780	298	1,561	1,192	551
	34%	30%	25%	35%	29%	26%	33%	31%	25%	34%	30%	26%	33%	30%	24%	36%	30%	28%
IMD 2	1,133	477	225	943	709	388	1,224	455	206	1,028	624	353	1,348	619	270	1,013	927	403
	23%	24%	21%	23%	25%	23%	23%	23%	20%	23%	24%	22%	23%	24%	22%	23%	24%	20%
IMD 3	863	387	186	703	550	303	900	362	172	788	489	275	1,018	479	205	699	759	361
	17%	19%	17%	17%	19%	18%	17%	18%	17%	18%	19%	17%	18%	18%	17%	16%	19%	18%
IMD 4	702	305	155	558	416	211	735	304	143	644	383	281	814	393	182	606	568	290
	14%	15%	14%	14%	15%	13%	14%	15%	14%	14%	15%	17%	14%	15%	15%	14%	15%	15%
IMD 5 (least deprived)	528	221	130	386	316	226	550	234	123	437	318	215	599	309	144	414	443	243
	11%	11%	12%	10%	11%	13%	11%	12%	12%	10%	12%	13%	10%	12%	12%	10%	11%	12%
unknown	56	15	105	35	24	110	74	24	134	48	18	85	74	27	134	44	23	138
	1%	1%	10%	1%	1%	7%	1%	1%	13%	1%	1%	5%	1%	1%	11%	1%	1%	7%
East of England	560	230	115	435	315	200	600	230	105	530	300	170	645	285	135	500	405	230
	11%	11%	11%	11%	11%	12%	12%	11%	10%	12%	11%	10%	11%	11%	11%	12%	10%	12%
London	635	310	180	505	565	350	640	300	175	540	410	320	735	405	210	550	820	360
	13%	15%	17%	12%	20%	21%	12%	15%	17%	12%	16%	20%	13%	16%	17%	13%	21%	18%
Midlands	915	395	180	735	485	295	975	400	170	830	480	300	1,065	510	225	800	685	380
	18%	20%	17%	18%	17%	18%	19%	20%	16%	18%	18%	18%	18%	20%	18%	18%	18%	19%
North East and Yorkshire	880	310	125	740	370	205	930	335	130	810	400	205	1,030	400	145	815	525	250
	18%	15%	12%	18%	13%	12%	18%	17%	12%	18%	15%	13%	18%	15%	12%	19%	13%	13%

	Mar-Jun 2017-19			Mar-Jun 2020			Jul-Oct 2017-19			Jul-Oct 2020			Nov-Feb 2017-20			Nov-Feb 2020-21		
	Type 1	Type 2	New	Type 1	Type 2	New	Type 1	Type 2	New	Type 1	Type 2	New	Type 1	Type 2	New	Type 1	Type 2	New
North West	790	290	145	665	420	195	770	290	125	690	415	205	880	400	145	625	575	255
	16%	14%	14%	16%	15%	12%	15%	14%	12%	15%	16%	13%	15%	15%	12%	14%	15%	13%
South East	660	255	150	580	410	225	700	290	135	630	390	230	800	365	160	595	575	280
	13%	13%	14%	14%	14%	13%	13%	14%	13%	14%	15%	14%	14%	14%	13%	14%	15%	14%
South West	460	185	85	345	235	125	510	145	90	415	195	125	545	215	110	395	285	130
	9%	9%	8%	9%	8%	7%	10%	7%	9%	9%	7%	8%	9%	8%	9%	9%	7%	7%
unknown	70	30	90	35	35	85	75	25	110	45	20	75	65	30	100	55	40	95
	1%	1%	8%	1%	1%	5%	1%	1%	11%	1%	1%	5%	1%	1%	8%	1%	1%	5%

Supplementary Table 5: Numbers of people diagnosed with Type 1 diabetes and Type 2 diabetes recorded in the National Diabetes Audit, and the estimated number of people in England without diabetes

Year	Type 1	Type 2	Without Type 1 or Type 2 diabetes
2016/17	221,622	2,633,055	52,413,390
2017/18	242,910	2,866,670	52,509,850
2018/19	247,390	2,990,546	52,739,242
2019/20	251,525	3,118,388	52,917,048

Supplementary Table 6: Incidence rates for type 1 and type 2 diabetes per 100,000 people with diabetes and newly diagnosed diabetes per 100,000 resident population and Incidence Rate Ratios during the first wave, post-first wave and second wave

	First wave			Post-first wave			Second wave		
	Mar-Jun 2017-19	Mar-Jun 2020	Incidence Rate Ratio	Jul-Oct 2017-19	Jul-Oct 2020	Incidence Rate Ratio	Nov-Feb 2017-20	Nov 20-Feb 21	Incidence Rate Ratio
Type 1 Diabetes	2,092	1,607	0.77	2,195	1,786	0.81	2,431	1,724	0.71
Type 2 diabetes	71	91	1.28	71.05	83.79	1.18	92	125	1.36
Newly diagnosed	2.0	3.2	1.56	2.0	3.1	1.55	2.3	3.8	1.60



Supplementary Table 7: Number of in-hospital deaths for patients with DKA during March to June 2020 (the first wave), July to October 2020 (post-first wave), November 2020 to February 2021 (second wave) and the mean of equivalent time periods in 2017-2020.

	Number of admissions	Died in hospital	% died in hospital
Mar-Jun 2020	8,553	658	8%
Type 1	4,041	115	3%
Type 2	2,831	485	17%
Newly diagnosed	1,681	58	3%
Mar-Jun 2017-19	8,048	303	4%
Type 1	4,965	72	1%
Type 2	2,010	205	10%
Newly diagnosed	1,072	26	2%
Jul-Oct 2020	8,729	412	5%
Type 1	4,491	80	2%
Type 2	2,613	304	12%
Newly diagnosed	1,625	28	2%
Jul-Oct 2017-19	8,260	284	3%
Type 1	5,208	87	2%
Type 2	2,011	179	9%
Newly diagnosed	1,041	18	2%
Nov-Feb 2021	10,235	968	9%
Type 1	4,337	134	3%
Type 2	3,912	752	19%
Newly diagnosed	1,986	82	4%
Nov-Feb 2017-20	9,610	414	4%
Type 1	5,769	105	2%
Type 2	2,608	278	11%
Newly diagnosed	1,234	30	2%

Supplementary table 8: Adjusted odds ratio for death in hospital for patients admitted as an emergency with DKA between March 2020 and June 2020, July 2020 and October 2020 and November 2020 and February 2021

		Odds Ratio	95% CI lower	95% CI upper	P value
Time period	Jul-Oct 2020	1.00			
	Mar-Jun 2020	1.26	1.09	1.45	0.002
	Nov20-Feb 21	1.14	0.99	1.32	0.053
COVID diagnosis	No COVID diagnosis	1.00			
	COVID diagnosis	4.76	4.25	5.33	<0.0001
Diabetes type	Type 1	1.00			
	Type 2	1.92	1.68	2.21	<0.0001
	Newly diagnosed	1.24	0.99	1.56	0.059
Sex	Male	1.00			
	Female	0.95	0.85	1.05	0.32
Ethnicity	White	1.00			
	non-white	1.23	1.05	1.43	0.011
	Newly diagnosed	1.13	0.95	1.36	0.17
Age	<19	0.02	0.00	0.13	0.0001
	19-29	0.08	0.03	0.17	<0.0001
	30-39	0.43	0.28	0.66	0.0001
	40-49	1.00			
	50-59	1.87	1.45	2.39	<0.0001
	60-69	4.06	3.21	5.15	<0.0001
	70+	9.14	7.28	11.46	<0.0001
Deprivation quintile	IMD 1 (most deprived)	1.27	1.06	1.52	0.010
	IMD 2	1.23	1.02	1.48	0.029
	IMD 3	1.07	0.89	1.30	0.47
	IMD 4	1.11	0.91	1.35	0.31
	IMD 5 (least deprived)	1.00			

\* Data shown are the results of a multivariable logistic regression model which included the explanatory variables shown, plus region