

Supplementary Table S1. Monthly birth counts, 2019-2023, in Balıkesir, Türkiye

Month	2019	2020	2021	2022	2023
1	1,042	932	798	872	929
2	833	863	744	771	795
3	935	923	894	871	853
4	1,015	903	934	866	778
5	1,017	962	934	894	888
6	959	1,050	954	1,082	864
7	1,178	1,115	1,078	1,086	1,001
8	1,118	1,090	1,010	1,006	981
9	1,058	1,003	926	937	862
10	936	895	878	797	842
11	897	894	912	865	851
12	920	814	805	839	792
Total	11,908	11,444	10,867	10,886	10,436

Supplementary Table S2. Monthly birth proportions, 2019-2023, in Balıkesir, Türkiye

Month	2019	2020	2021	2022	2023
1	0.088	0.081	0.073	0.080	0.089
2	0.070	0.075	0.068	0.071	0.076
3	0.079	0.081	0.082	0.080	0.082
4	0.085	0.079	0.086	0.080	0.075
5	0.085	0.084	0.086	0.082	0.085
6	0.081	0.092	0.088	0.099	0.083
7	0.099	0.097	0.099	0.100	0.096
8	0.094	0.095	0.093	0.092	0.094
9	0.089	0.088	0.085	0.086	0.083
10	0.079	0.078	0.081	0.073	0.081
11	0.075	0.078	0.084	0.079	0.082
12	0.077	0.071	0.074	0.077	0.076

Monthly birth proportions are within-year fractions of annual live births occurring in each calendar month, calculated as (number of live births in month m) ÷ (total live births in that year) for Balıkesir, Türkiye; proportions across the 12 months sum to 1.00 within each year (subject to rounding). Example: January 2020 proportion = 932 ÷ 11,444 = 0.081.

Example for monthly calculation

The projected number of one-month-old infants in December 2024 was obtained by multiplying the 2024 total for ages 0-11 months (10,012; Supplementary Table S3) by the November 2023 proportion (0.082; Supplementary Table S2), yielding 821 infants. All monthly projections are reported in Supplementary Table S4.

Supplementary Table S3. Population by single year of age and calendar year, in Balıkesir, Türkiye

Year	0-11 Mo	12-23 Mo	24-35 Mo	36-47 Mo	48-59 Mo
2019	11,650	12,827	13,173	13,552	13,561
2020	11,262	11,971	13,072	13,300	13,661
2021	10,709	11,691	12,250	13,252	13,513
2022	10,778	11,073	11,885	12,463	13,450
2023	10,294	11,247	11,324	12,119	12,786
2024*	10,012	10,524	11,329	11,413	12,195

*Only year 2024 used for analysis, Mo:month.

Supplementary Table S4. Monthly age-specific population projections for 2024 (rounded), in Balıkesir, Türkiye

Age (Mo)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	891	761	821	751	851	831	961	941	831	811	821	761
1	800	891	761	821	751	851	831	961	941	831	811	821
2	863	800	891	761	821	751	851	831	961	941	831	811
3	852	863	800	891	761	821	751	851	831	961	941	831
4	873	852	863	800	891	761	821	751	851	831	961	941
5	989	873	852	863	800	891	761	821	751	851	831	961
6	1,010	989	873	852	863	800	891	761	821	751	851	831
7	873	1,010	989	873	852	863	800	891	761	821	751	851
8	895	873	1,010	989	873	852	863	800	891	761	821	751
9	789	895	873	1,010	989	873	852	863	800	891	761	821
10	863	789	895	873	1,010	989	873	852	863	800	891	761
11	800	863	789	895	873	1,010	989	873	852	863	800	891
12	937	800	863	789	895	873	1,010	989	873	852	863	800
13	872	937	800	863	789	895	873	1,010	989	873	852	863
14	895	872	937	800	863	789	895	873	1,010	989	873	852
15	827	895	872	937	800	863	789	895	873	1,010	989	873
16	974	827	895	872	937	800	863	789	895	873	1,010	989
17	1,042	974	827	895	872	937	800	863	789	895	873	1,010
18	1,133	1,042	974	827	895	872	937	800	863	789	895	873
19	1,122	1,133	1,042	974	827	895	872	937	800	863	789	895
20	929	1,122	1,133	1,042	974	827	895	872	937	800	863	789
21	906	929	1,122	1,133	1,042	974	827	895	872	937	800	863
22	906	906	929	1,122	1,133	1,042	974	827	895	872	937	800
23	804	906	906	929	1,122	1,133	1,042	974	827	895	872	937
24	906	804	906	906	929	1,122	1,133	1,042	974	827	895	872
25	845	906	804	906	906	929	1,122	1,133	1,042	974	827	895
26	959	845	906	804	906	906	929	1,122	1,133	1,042	974	827
27	924	959	845	906	804	906	906	929	1,122	1,133	1,042	974
28	970	924	959	845	906	804	906	906	929	1,122	1,133	1,042
29	1,061	970	924	959	845	906	804	906	906	929	1,122	1,133
30	1,130	1,061	970	924	959	845	906	804	906	906	929	1,122

Supplementary Table S4. Monthly age-specific population projections for 2024 (rounded), in Balıkesir, Türkiye

Age (Mo)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
31	1,004	1,130	1,061	970	924	959	845	906	804	906	906	929
32	982	1,004	1,130	1,061	970	924	959	845	906	804	906	906
33	982	982	1,004	1,130	1,061	970	924	959	845	906	804	906
34	936	982	982	1,004	1,130	1,061	970	924	959	845	906	804
35	776	936	982	982	1,004	1,130	1,061	970	924	959	845	906
36	833	776	936	982	982	1,004	1,130	1,061	970	924	959	845
37	866	833	776	936	982	982	1,004	1,130	1,061	970	924	959
38	951	866	833	776	936	982	982	1,004	1,130	1,061	970	924
39	951	951	866	833	776	936	982	982	1,004	1,130	1,061	970
40	1,073	951	951	866	833	776	936	982	982	1,004	1,130	1,061
41	1,159	1,073	951	951	866	833	776	936	982	982	1,004	1,130
42	1,183	1,159	1,073	951	951	866	833	776	936	982	982	1,004
43	1,122	1,183	1,159	1,073	951	951	866	833	776	936	982	982
44	1,024	1,122	1,183	1,159	1,073	951	951	866	833	776	936	982
45	963	1,024	1,122	1,183	1,159	1,073	951	951	866	833	776	936
46	988	963	1,024	1,122	1,183	1,159	1,073	951	951	866	833	776
47	915	988	963	1,024	1,122	1,183	1,159	1,073	951	951	866	833
48	988	915	988	963	1,024	1,122	1,183	1,159	1,073	951	951	866
49		988	915	988	963	1,024	1,122	1,183	1,159	1,073	951	951
50			988	915	988	963	1,024	1,122	1,183	1,159	1,073	951
51				988	915	988	963	1,024	1,122	1,183	1,159	1,073
52					988	915	988	963	1,024	1,122	1,183	1,159
53						988	915	988	963	1,024	1,122	1,183
54							988	915	988	963	1,024	1,122
55								988	915	988	963	1,024
56									988	915	988	963
57										988	915	988
58											988	915
59												988

Example for vaccine-refusal calculation

For May 2024, the denominator for calculating refusals of the DTaP-IPV booster (“DTaP-IPV R”) is the number of 48-month-old children (Supplementary Table S5). This count, taken from Supplementary Table S4, is 1,024. The corresponding number of refusals recorded in May 2024 is 33 (Supplementary Table S6). Thus, the refusal rate is $33 / 1,024 = 0.0322$, or 32.2 per 1,000 children. Refusal rates for January to December 2024 are summarized in Supplementary Table S7.

Supplementary Table S5. Age-vaccine month correspondence

Schedule	Vaccine
1 Mo	Hepatitis B II
6 Mo	Hepatitis B III
2 Mo	BCG I
2 Mo	DTaP-IPV-Hib I
4 Mo	DTaP-IPV-Hib II
6 Mo	DTaP-IPV-Hib III
18 Mo	DTaP-IPV-Hib R
48 Mo	DTaP-IPV R
2 Mo	PCV I
4 Mo	PCV II
12 Mo	PCV R
6 Mo	OPV I
18 Mo	OPV II
12 Mo	MMR I
48 Mo	MMR II
12 Mo	Varicella I
18 Mo	Hepatitis A I
24 Mo	Hepatitis A II

BCG: Bacille Calmette-Guérin vaccine, DaPT-IPV: Quadrivalent Diphtheria and tetanus toxoid with acellular pertussis + Inactivated polio vaccine, DaPT-IPV-HIB: Pentavalent Diphtheria and tetanus toxoid with acellular pertussis + Inactivated polio vaccine + Haemophilus influenza pediatric dose vaccine, HAV: Hepatitis A pediatric dose vaccine, Hepatitis B: Hepatitis B pediatric dose vaccine, MMR: Measles. Mumps. Rubella vaccine, Mo: At the end of months, OPV: Oral Polio Vaccine, PCV: Pneumococcal conjugate vaccine, R: Rappel (Booster), Varicella: Varicella vaccine.

Supplementary Table S6. Dose-specific monthly vaccine refusal counts per, January to December 2024, in Balıkesir, Türkiye

Schedule	Vaccine	Jan 24	Feb 24	Mar 24	Apr 24	May 24	Jun 24	Jul 24	Aug 24	Sep 24	Oct 24	Nov 24	Dec 24
1 Mo	Hepatitis B II	1	5	3	2	13	8	12	13	14	21	11	12
6 Mo	Hepatitis B III	1	2	3	3	21	12	10	14	11	19	15	19
2 Mo	BCG I	5	1	5	1	10	13	7	12	13	14	24	12
2 Mo	DTaP-IPV-Hib I	5	1	6	2	9	13	8	14	14	14	26	12
4 Mo	DTaP-IPV-Hib II	1	4	5	2	10	13	12	17	9	15	17	21
6 Mo	DTaP-IPV-Hib III	1	2	3	3	20	12	11	14	12	19	15	18
18 Mo	DTaP-IPV-Hib R	3	3	4	5	22	19	14	30	34	23	30	20
48 Mo	DTaP-IPV R	6	8	3	6	33	21	27	26	28	27	28	42
2 Mo	PCV I	5	1	6	2	9	14	8	14	14	14	26	12
4 Mo	PCV II	1	4	5	2	10	13	12	18	9	15	17	20
12 Mo	PCV R	2	2	7	4	23	23	14	25	21	22	22	15
6 Mo	OPV I	1	2	3	3	20	12	11	14	12	19	15	18
18 Mo	OPV II	3	3	4	6	20	18	14	30	32	22	31	20
12 Mo	MMR I	2	2	8	6	24	22	14	25	21	22	22	14
48 Mo	MMR II	6	8	3	6	32	20	26	26	29	26	28	41
12 Mo	Varicella I	2	2	5	4	23	23	14	25	22	22	22	14
18 Mo	Hepatitis A I	3	3	4	6	21	18	13	30	34	22	29	20
24 Mo	Hepatitis A II	4	5	1	3	30	30	22	21	27	31	25	21

BCG: Bacille Calmette-Guérin vaccine, DaPT-IPV: Quadrivalent Diphtheria and tetanus toxoid with acellular pertussis + Inactivated polio vaccine, DaPT-IPV-HIB: Pentavalent Diphtheria and tetanus toxoid with acellular pertussis + Inactivated polio vaccine + Haemophilus influenzae pediatric dose vaccine, HAV: Hepatitis A pediatric dose vaccine, Hepatitis B: Hepatitis B pediatric dose vaccine, MMR: Measles, Mumps, Rubella vaccine, Mo: At the end of months, OPV: Oral Polio Vaccine, PCV: Pneumococcal conjugate vaccine, R: Rappel (Booster), Varicella: Varicella vaccine.

Supplementary Table S7. Dose-specific monthly vaccine refusal rates per thousand, January to December 2024, in Balıkesir, Türkiye

Schedule	Vaccine	Jan 24	Feb 24	Mar 24	Apr 24	May 24	Jun 24	Jul 24	Aug 24	Sep 24	Oct 24	Nov 24	Dec 24
1 Mo	Hepatitis B II	1.3 (0.2-7.0)	5.6 (2.4-13.1)	3.9 (1.3-11.5)	2.4 (0.7-8.8)	17.3 (10.1-29.4)	9.4 (4.8-18.4)	14.9 (8.3-25.1)	13.5 (7.9-23.0)	14.9 (8.9-24.8)	25.3 (16.6-38.3)	13.6 (7.6-24.1)	14.6 (8.4-25.4)
6 Mo	Hepatitis B III	1.0 (0.2-5.6)	2.0 (0.6-7.3)	3.4 (1.2-10.0)	3.5 (1.2-10.3)	24.3 (16.0-36.9)	15.0 (8.6-26.0)	11.2 (6.1-20.5)	18.4 (11.0-30.6)	13.4 (7.5-23.8)	25.3 (16.3-39.2)	17.6 (10.7-28.9)	22.9 (14.7-35.4)
2 Mo	BCG I	5.8 (2.5-13.5)	1.3 (0.2-7.0)	5.6 (2.4-13.1)	1.3 (0.2-7.4)	12.2 (6.6-22.3)	17.3 (10.1-29.4)	8.2 (4.0-16.9)	14.4 (8.3-25.1)	13.5 (7.9-23.0)	14.9 (8.9-24.8)	28.9 (19.5-42.6)	14.8 (8.5-25.7)
2 Mo	DTap-IPV-Hib I	5.8 (2.5-13.5)	1.3 (0.2-7.0)	6.7 (3.1-14.6)	2.6 (0.7-9.5)	11.0 (5.8-20.7)	17.3 (10.1-29.4)	9.4 (4.8-18.4)	16.8 (10.1-28.1)	14.6 (8.7-24.3)	14.9 (8.9-24.8)	31.3 (21.4-45.4)	14.8 (8.5-25.7)
4 Mo	DTap-IPV-Hib II	1.1 (0.2-6.5)	4.7 (1.8-12.0)	5.8 (2.5-13.5)	2.5 (0.7-9.1)	11.2 (6.1-20.5)	17.1 (10.0-29.0)	14.6 (8.4-25.4)	22.6 (14.2-36.0)	10.6 (5.6-20.0)	18.1 (11.0-29.6)	17.7 (11.1-28.1)	22.3 (14.6-33.9)
6 Mo	DTap-IPV-Hib III	1.0 (0.2-5.6)	2.0 (0.6-7.3)	3.4 (1.2-10.0)	3.5 (1.2-10.3)	23.2 (15.1-35.5)	15.0 (8.6-26.0)	12.3 (6.9-22.0)	18.4 (11.0-30.6)	14.6 (8.4-25.4)	25.3 (16.3-39.2)	17.6 (10.7-28.9)	21.7 (13.7-34.0)
18 Mo	DTap-IPV-Hib R	2.6 (0.9-7.8)	2.9 (1.0-8.4)	4.1 (1.6-10.5)	6.0 (2.6-14.1)	24.6 (16.3-36.9)	21.8 (14.0-33.8)	14.9 (8.9-24.9)	37.5 (26.4-53.0)	39.4 (28.3-54.6)	29.1 (19.5-43.3)	33.5 (23.6-47.5)	22.9 (14.9-35.1)
48 Mo	DTap-IPV R	6.1 (2.8-13.2)	8.7 (4.4-17.2)	3.0 (1.0-8.9)	6.2 (2.9-13.5)	32.2 (23.0-44.9)	18.7 (12.3-28.4)	22.8 (15.7-33.0)	22.4 (15.4-32.7)	26.1 (18.1-37.5)	28.4 (19.6-41.0)	29.4 (20.4-42.2)	48.5 (36.1-64.9)
2 Mo	PCV I	5.8 (2.5-13.5)	1.3 (0.2-7.0)	6.7 (3.1-14.6)	2.6 (0.7-9.5)	11.0 (5.8-20.7)	18.6 (11.1-31.1)	9.4 (4.8-18.4)	16.8 (10.1-28.1)	14.6 (8.7-24.3)	14.9 (8.9-24.8)	31.3 (21.4-45.4)	14.8 (8.5-25.7)
4 Mo	PCV II	1.1 (0.2-6.5)	4.7 (1.8-12.0)	5.8 (2.5-13.5)	2.5 (0.7-9.1)	11.2 (6.1-20.5)	17.1 (10.0-29.0)	14.6 (8.4-25.4)	24.0 (15.2-37.6)	10.6 (5.6-20.0)	18.1 (11.0-29.6)	17.7 (11.1-28.1)	21.3 (13.8-32.6)
12 Mo	PCV R	2.1 (0.6-7.8)	2.5 (0.7-9.1)	8.1 (3.9-16.6)	5.1 (2.0-13.0)	25.7 (17.2-38.3)	26.3 (17.6-39.2)	13.9 (8.3-23.1)	25.3 (17.2-37.0)	24.0 (15.8-36.5)	25.8 (17.1-38.8)	25.5 (16.9-38.3)	18.8 (11.4-30.7)
6 Mo	OPV I	1.0 (0.2-5.6)	2.0 (0.6-7.3)	3.4 (1.2-10.0)	3.5 (1.2-10.3)	23.2 (15.1-35.5)	15.0 (8.6-26.0)	12.3 (6.9-22.0)	18.4 (11.0-30.6)	14.6 (8.4-25.4)	25.3 (16.3-39.2)	17.6 (10.7-28.9)	21.7 (13.7-34.0)
18 Mo	OPV II	2.6 (0.9-7.8)	2.9 (1.0-8.4)	4.1 (1.6-10.5)	7.3 (3.3-15.7)	22.3 (14.5-34.3)	20.6 (13.1-32.4)	14.9 (8.9-24.9)	37.5 (26.4-53.0)	37.1 (26.4-51.9)	27.9 (18.5-41.8)	34.7 (24.5-48.8)	22.9 (14.9-35.1)
12 Mo	MMR I	2.1 (0.6-7.8)	2.5 (0.7-9.1)	9.3 (4.7-18.2)	7.6 (3.5-16.5)	26.8 (18.1-39.6)	25.2 (16.7-37.8)	13.9 (8.3-23.1)	25.3 (17.2-37.0)	24.0 (15.8-36.5)	25.8 (17.1-38.8)	25.5 (16.9-38.3)	17.5 (10.5-29.2)
48 Mo	MMR II	6.1 (2.8-13.2)	8.7 (4.4-17.2)	3.0 (1.0-8.9)	6.2 (2.9-13.5)	31.2 (22.2-43.8)	17.8 (11.6-27.4)	22.0 (15.0-32.0)	22.4 (15.4-32.7)	27.0 (18.9-38.5)	27.3 (18.7-39.7)	29.4 (20.4-42.2)	47.4 (35.1-63.6)
12 Mo	Varicella I	2.1 (0.6-7.8)	2.5 (0.7-9.1)	5.8 (2.5-13.5)	5.1 (2.0-13.0)	25.7 (17.2-38.3)	26.3 (17.6-39.2)	13.9 (8.3-23.1)	25.3 (17.2-37.0)	25.2 (16.7-37.8)	25.8 (17.1-38.8)	25.5 (16.9-38.3)	17.5 (10.5-29.2)
18 Mo	Hepatitis A I	2.6 (0.9-7.8)	2.9 (1.0-8.4)	4.1 (1.6-10.5)	7.3 (3.3-15.7)	23.5 (15.4-35.6)	20.6 (13.1-32.4)	13.9 (8.1-23.6)	37.5 (26.4-53.0)	39.4 (28.3-54.6)	27.9 (18.5-41.8)	32.4 (22.7-46.2)	22.9 (14.9-35.1)
24 Mo	Hepatitis A II	4.4 (1.7-11.3)	6.2 (2.7-14.5)	1.1 (0.2-6.2)	3.3 (1.1-9.7)	32.3 (22.7-45.7)	26.7 (18.8-37.9)	19.4 (12.9-29.2)	20.1 (13.2-30.6)	27.7 (19.1-40.0)	37.5 (26.5-52.7)	27.9 (19.0-40.9)	24.1 (15.8-36.5)

BCG: Bacille Calmette-Guérin vaccine, DaPT-IPV: Quadrivalent Diphtheria and tetanus toxoid with acellular pertussis + Inactivated polio vaccine, DaPT-IPV-HIB: Pentavalent Diphtheria and tetanus toxoid with acellular pertussis + Inactivated polio vaccine + Haemophilus influenzae pediatric dose vaccine, HAV: Hepatitis A pediatric dose vaccine, Hepatitis B: Hepatitis B pediatric dose vaccine, MMR: Measles, Mumps, Rubella vaccine, Mo: At the end of months, OPV: Oral Polio Vaccine, PCV: Pneumococcal conjugate vaccine, R: Rappel (Booster), Varicella: Varicella vaccine.

Links for monthly data

Supplementary Table S8. Official and archived links for monthly family medicine practice performance exception forms, 2024

Month	Webpage	Archived Webpage
January	https://dosyaism.saglik.gov.tr/Eklenti/212181/0/2024-ocak-ayi-performans-komisyon-sonucu-site-listesi-pdf.pdf	https://web.archive.org/web/20260219070849/https://dosyaism.saglik.gov.tr/Eklenti/212181/0/2024-ocak-ayi-performans-komisyon-sonucu-site-listesi-pdf.pdf
February	https://dosyaism.saglik.gov.tr/Eklenti/214209/0/2024-subat-ayi-performans-komisyon-sonucu-site-listesi-pdf.pdf	https://web.archive.org/web/20250716124504/https://dosyaism.saglik.gov.tr/Eklenti/214209/0/2024-subat-ayi-performans-komisyon-sonucu-site-listesi-pdf.pdf
March	https://dosyaism.saglik.gov.tr/Eklenti/219387/0/aile-hekimleri-performans-istiraz-listesi-mart-2024pdf.pdf	https://web.archive.org/web/20250716125008/https://dosyaism.saglik.gov.tr/Eklenti/219387/0/aile-hekimleri-performans-istiraz-listesi-mart-2024pdf.pdf
April	https://dosyaism.saglik.gov.tr/Eklenti/219378/0/aile-hekimleri-performans-istiraz-listesi-nisan-2024pdf.pdf	https://web.archive.org/web/20250716130200/https://dosyaism.saglik.gov.tr/Eklenti/219378/0/aile-hekimleri-performans-istiraz-listesi-nisan-2024pdf.pdf
May	https://dosyaism.saglik.gov.tr/Eklenti/222303/0/2024-mayis-ayi-performans-komisyon-sonucu-site-listesi-guncellenmispdf.pdf	https://web.archive.org/web/20250716130515/https://dosyaism.saglik.gov.tr/Eklenti/222303/0/2024-mayis-ayi-performans-komisyon-sonucu-site-listesi-guncellenmispdf.pdf
June	https://dosyaism.saglik.gov.tr/Eklenti/223842/0/2024-haziran-ayi-performans-komisyon-sonucu-site-listesi-pdf.pdf	https://web.archive.org/web/20250716130612/https://dosyaism.saglik.gov.tr/Eklenti/223842/0/2024-haziran-ayi-performans-komisyon-sonucu-site-listesi-pdf.pdf
July	https://dosyaism.saglik.gov.tr/Eklenti/225771/0/2024-temmuz-ayi-performans-komisyon-sonucu-site-listesi-pdf.pdf	https://web.archive.org/web/20250716130651/https://dosyaism.saglik.gov.tr/Eklenti/225771/0/2024-temmuz-ayi-performans-komisyon-sonucu-site-listesi-pdf.pdf
August	https://dosyaism.saglik.gov.tr/Eklenti/227773/0/2024-agustos-ayi-performans-komisyon-sonucu-site-listesi-pdf.pdf	https://web.archive.org/web/20250716130740/https://dosyaism.saglik.gov.tr/Eklenti/227773/0/2024-agustos-ayi-performans-komisyon-sonucu-site-listesi-pdf.pdf
September	https://dosyaism.saglik.gov.tr/Eklenti/229853/0/2024-eylul-ayi-performans-komisyon-sonucu--site-listesi-pdf.pdf	https://web.archive.org/web/20250716131011/https://dosyaism.saglik.gov.tr/Eklenti/229853/0/2024-eylul-ayi-performans-komisyon-sonucu--site-listesi-pdf.pdf
October	https://dosyaism.saglik.gov.tr/Eklenti/232464/0/2024-ekim-performans-komisyon-listesi-pdf.pdf	https://web.archive.org/web/20250716131201/https://dosyaism.saglik.gov.tr/Eklenti/232464/0/2024-ekim-performans-komisyon-listesi-pdf.pdf
November	https://dosyaism.saglik.gov.tr/Eklenti/234263/0/2024-kasim-ayi-performans-komisyon-sonucu-site-listesi-pdf.pdf	https://web.archive.org/web/20250716131532/https://dosyaism.saglik.gov.tr/Eklenti/234263/0/2024-kasim-ayi-performans-komisyon-sonucu-site-listesi-pdf.pdf
December	https://dosyaism.saglik.gov.tr/Eklenti/236904/0/2024-aralik-ayi-performans-komisyon-sonucu-site-listesipdf.pdf	https://web.archive.org/web/20250716132806/https://dosyaism.saglik.gov.tr/Eklenti/236904/0/2024-aralik-ayi-performans-komisyon-sonucu-site-listesipdf.pdf

Supplementary Table S9. Vaccine refusal counts by groups in 2024, in Balıkesir, Türkiye

Vaccine Group	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
BCG	5	1	5	1	10	13	7	12	13	14	24	12
DTaP-IPV/+Hib**	16	18	21	18	94	78	72	101	97	98	116	113
Hepatitis A	7	8	5	9	51	48	35	51	61	53	54	41
Hepatitis B	2	7	6	5	34	20	22	27	25	40	26	31
MMR	8	10	11	12	56	42	40	51	50	48	50	55
OPV	4	5	7	9	40	30	25	44	44	41	46	38
PCV	8	7	18	8	42	50	34	57	44	51	65	47
Varicella	2	2	5	4	23	23	14	25	22	22	22	14

BCG: Bacille Calmette-Guérin vaccine, DaPT-IPV: Quadrivalent Diphtheria and tetanus toxoid with acellular pertussis + Inactivated polio vaccine, DaPT-IPV-HIB: Pentavalent Diphtheria and tetanus toxoid with acellular pertussis + Inactivated polio vaccine + Haemophilus influenza pediatric dose vaccine, HAV: Hepatitis A pediatric dose vaccine, Hepatitis B: Hepatitis B pediatric dose vaccine, MMR: Measles. Mumps. Rubella vaccine, OPV: Oral Polio Vaccine, PCV: Pneumococcal conjugate vaccine, Varicella: Varicella vaccine.

Supplementary Table S10. Vaccine refusal rate per 1,000 children in 2024 by groups and month, in Balıkesir, Türkiye

Vaccine Group	Jan 24	Feb 24	Mar 24	Apr 24	May 24	Jun 24	Jul 24	Aug 24	Sep 24	Oct 24	Nov 24	Dec 24
BCC	5.8 (2.5 - 13.5)	1.3 (0.2 - 7)	5.6 (2.4 - 13.1)	1.3 (0.2 - 7.4)	12.2 (6.6 - 22.3)	17.3 (10.1 - 29.4)	8.2 (4.0 - 16.9)	14.4 (8.3 - 25.1)	13.5 (7.9 - 23)	14.9 (8.9 - 24.8)	28.9 (19.5 - 42.6)	14.8 (8.5 - 25.7)
DTap-IPV/+Hib**	3.3 (2.0 - 5.3)	3.9 (2.5 - 6.2)	4.6 (3.0 - 7.0)	4.3 (2.7 - 6.8)	20.9 (17.1 - 25.5)	18.1 (14.5 - 22.5)	15.4 (12.2 - 19.3)	23.5 (19.4 - 28.5)	21.2 (17.4 - 25.8)	23.0 (18.9 - 27.9)	25.8 (21.6 - 30.9)	26.1 (21.8 - 31.3)
Hepatitis A	3.4 (1.7 - 7.1)	4.3 (2.2 - 8.5)	2.7 (1.1 - 6.2)	5.2 (2.7 - 9.8)	28.0 (21.3 - 36.6)	24.1 (18.2 - 31.8)	16.9 (12.2 - 23.4)	27.7 (21.1 - 36.2)	33.2 (25.9 - 42.4)	32.8 (25.2 - 42.6)	30.2 (23.2 - 39.2)	23.5 (17.4 - 31.7)
Hepatitis B	1.1 (0.3 - 4)	3.7 (1.8 - 7.7)	3.7 (1.7 - 8.0)	3.0 (1.3 - 7.0)	21.1 (15.1 - 29.3)	12.1 (7.9 - 18.6)	12.8 (8.5 - 19.3)	15.7 (10.8 - 22.7)	14.2 (9.6 - 20.9)	25.3 (18.6 - 34.2)	15.6 (10.7 - 22.8)	18.8 (13.3 - 26.5)
MMR	4.2 (2.1 - 8.2)	5.8 (3.2 - 10.7)	5.9 (3.3 - 10.6)	6.8 (3.9 - 11.9)	29.2 (22.5 - 37.7)	21 (15.6 - 28.3)	18.2 (13.4 - 24.7)	23.7 (18.1 - 31.1)	25.7 (19.5 - 33.7)	26.6 (20.1 - 35.1)	27.6 (21.0 - 36.2)	33.0 (25.5 - 42.7)
OPV	1.9 (0.7 - 4.8)	2.5 (1.1 - 5.7)	3.8 (1.8 - 7.8)	5.4 (2.8 - 10.2)	22.8 (16.8 - 30.8)	17.9 (12.6 - 25.5)	13.7 (9.3 - 20.1)	28.2 (21.1 - 37.6)	26.1 (19.5 - 34.9)	26.6 (19.7 - 35.9)	26.4 (19.8 - 35.0)	22.3 (16.3 - 30.5)
PCV	3.0 (1.5 - 5.9)	2.9 (1.4 - 5.9)	6.9 (4.4 - 10.8)	3.4 (1.7 - 6.7)	16.1 (11.9 - 21.7)	21.0 (15.9 - 27.5)	12.7 (9.1 - 17.7)	22.2 (17.2 - 28.6)	16.4 (12.2 - 21.9)	19.4 (14.8 - 25.5)	24.5 (19.3 - 31.1)	18.4 (13.9 - 24.4)
Varicella	2.1 (0.6 - 7.8)	2.5 (0.7 - 9.1)	5.8 (2.5 - 13.5)	5.1 (2 - 13)	25.7 (17.2 - 38.3)	26.3 (17.6 - 39.2)	13.9 (8.3 - 23.1)	25.3 (17.2 - 37.0)	25.2 (16.7 - 37.8)	25.8 (17.1 - 38.8)	25.5 (16.9 - 38.3)	17.5 (10.5 - 29.2)

BCC: Bacille Calmette-Guérin vaccine, DaPT-IPV: Quadrivalent Diphtheria and tetanus toxoid with acellular pertussis + Inactivated polio vaccine, DaPT-IPV-Hib: Pentavalent Diphtheria and tetanus toxoid with acellular pertussis + Inactivated polio vaccine + Haemophilus influenzae pediatric dose vaccine, HAV: Hepatitis A pediatric dose vaccine, Hepatitis B: Hepatitis B pediatric dose vaccine, MMR: Measles, Mumps, Rubella vaccine, OPV: Oral Polio Vaccine, PCV: Pneumococcal conjugate vaccine, Varicella: Varicella vaccine.

Interrupted Time-series Models

Model 1 expresses the monthly vaccine-refusal rate as a segmented linear function of time, comprising the underlying pre-intervention trend, a level change at the intervention (May 2024), and a new slope after that date. Model 2 extends this specification by allowing these effects to differ across vaccine antigens, with BCG serving as the reference category (since it is listed first alphabetically and therefore omitted from the vaccine dummies).

- month_numeric: base trend before the intervention
- after_intervention: the immediate jump/drop at the intervention
- time_after_intervention: the change in trend (slope) after the intervention
- vaccine: the specific vaccine type.

```
Model 1 <- lm(rate ~ (month_numeric + after_intervention + time_after_intervention))
Model 2 <- lm(rate ~ (month_numeric + after_intervention + time_after_intervention + vaccine))
```

Supplementary Table S11. Regression models for monthly vaccine refusal rates

Predictor Term	Model 1			Model 2		
	β	p-value	Sig.	β	p-value	Sig.
Common Temporal Effects						
Intercept	2.604	0.438		2.832	0.372	
Pre-Intervention Trend	0.544	0.653		0.524	0.364	
Intervention Level Change in May	13.675	0.005	**	13.437	<0.001	***
Intervention Slope Change	0.223	0.860		0.289	0.636	
Additive Effects for Vaccine Type						
DTaP-IPV R				-4.180	0.007	**
DTaP-IPV-Hib I				5.361	<0.001	***
DTaP-IPV-Hib II				-3.493	0.024	*
DTaP-IPV-Hib III				-3.338	0.031	*
DTaP-IPV-Hib R				-2.523	0.101	
Hepatitis A I				4.258	0.006	**
Hepatitis A II				3.882	0.012	*
Hepatitis B II				3.540	0.022	*
Hepatitis B III				-4.344	0.005	**
MMR I				-2.521	0.102	
MMR II				1.427	0.353	
OPV I				5.029	0.001	**
OPV II				-2.523	0.101	
PCV I				3.871	0.012	*
PCV II				-3.382	0.029	*
PCV R				-3.315	0.032	*
Varicella I				1.226	0.425	

Model 1 Overall Model Fit: Multiple R² = 0.941, Adjusted R² = 0.919, F(3, 8) = 42.33, p < 0.001.
 Model 2 Overall Model Fit: Multiple R² = 0.756, Adjusted R² = 0.731, F(20, 195) = 30.18, p < 0.001.
 Note: month_numeric is coded 1 (Jan 2024) to 12 (Dec 2024). after_intervention is 1 for months >= May 2024, 0 otherwise. time_after_intervention is month_numeric - 5 for months >= May 2024, 0 otherwise. Baseline is BCG I For Model 2. Significance levels are: *p < 0.05, **p < 0.01, ***p < 0.001.
 BCG: Bacille Calmette-Guérin vaccine, DaPT-IPV: Quadrivalent Diphtheria and tetanus toxoid with acellular pertussis + Inactivated polio vaccine, DaPT-IPV-HIB: Pentavalent Diphtheria and tetanus toxoid with acellular pertussis + Inactivated polio vaccine + Haemophilus influenzae pediatric dose vaccine, HAV: Hepatitis A pediatric dose vaccine, Hepatitis B: Hepatitis B pediatric dose vaccine, MMR: Measles. Mumps. Rubella vaccine, OPV: Oral Polio Vaccine, PCV: Pneumococcal conjugate vaccine, R: Rappel (Booster), Varicella: Varicella vaccine.