Attachment 1: Supplementary tables

Table S1: Annual suspected and positive cases of malaria at the Institute for Laboratory Medicine

Year	Suspected cases	Positive cases
2003	16	1
2004	26	1
2005	32	1
2006	26	0
2007	18	2
2008	20	2
2009	20	4
2010	28	0
2011	25	3
2012	31	0
2013	29	2
2014	23	4
2015	25	0
2016	28	2
2017	25	2
2018	27	4
2019	43	5
2020	13	3
2021	15	6
2022	16	2
Total	486	44

Table S2: Annual malaria cases reported to the Robert Koch Institute, 2003–2022

Year	Reported cases
2003	821
2004	709
2005	632
2006	569
2007	542
2008	554
2009	526
2010	635
2011	564
2012	551
2013	639
2014	1006
2015	1061
2016	962
2017	957
2018	900
2019	999
2020	366
2021	614
2022	772
Total	14379

Source: Table created with data from the SurvStat@RKI database of the Robert Koch Institute. Retrieved from https://survstat.rki.de [15].

Attachment 1 to: *Kienberger V, Müller O, Hunfeld KP. Travel-associated malaria in the Rhine-Main area: An evaluation of the cases diagnosed at the Institute for Laboratory Medicine, Microbiology and Infection Control at the Northwest Medical Centre in Frankfurt/Main, Germany, from 2003 to 2022. GMS Z Forder Qualitatssich Med Lab. 2025;16:Doc02. DOI: 10.3205/lab000050, URN: urn:nbn:de:0183-lab0000508*

Table S3: Malaria cases in Hesse and cases diagnosed at the Laboratory Institute

Year	Cases in Hesse	Cases at the Laboratory Institute of the Northwest Medical Centre	
		Count	Proportion (on the Cases in Hesse)
2003	66	1	1.5%
2004	47	1	2.1%
2005	65	1	1.5%
2006	45	0	0.0%
2007	49	2	4.1%
2008	40	2	5.0%
2009	55	4	7.3%
2010	63	0	0.0%
2011	55	3	5.5%
2012	58	0	0.0%
2013	101	2	2.0%
2014	109	4	3.7%
2015	130	0	0.0%
2016	73	2	2.7%
2017	77	2	2.6%
2018	75	4	5.3%
2019	65	5	7.7%
2020	20	3	15.0%
2021	38	6	15.8%
2022	66	2	3.0%
Total	**1297**	**44**	**3.4%**
Minimum	20.0	0.0	0.0%
Maximum	130.0	6.0	15.8%
Mean	64.9	2.2	4.2%

Source: Table created with case data from the Laboratory Institute of the Northwest Medical Centre and with data from the SurvStat@RKI database of the Robert Koch Institute. Retrieved from https://survstat.rki.de [15].

Table S4: Percentages according to age groups (Institute for Laboratory Medicine)

Age group	Cases	Percentage
10–14	1	2.3
15–19	2	4.5
20–24	6	13.6
25–29	4	9.1
30–34	2	4.5
35–39	4	9.1
40–44	10	22.7
45–49	2	4.5
50–54	5	11.4
55–59	2	4.5
60–64	2	4.5
65–69	3	6.8
80+	1	2.3
Total	44	100.0

Table S5: Mean age over the course of time (Institute for Laboratory Medicine)

4-year-intervals	Mean age
2003–2006	41.0
2007–2010	39.0
2011–2014	38.7
2015–2018	34.4
2019–2022	46.9

Table S6: Malaria cases reported to the RKI – distribution of the age groups

Age group	Count	Percentage
00–04	393	2.7%
05–09	389	2.7%
10–14	413	2.9%
15–19	946	6.6%
20–24	1,401	9.8%
25–29	1,478	10.3%
30–34	1,574	11.0%
35–39	1,742	12.1%
40–44	1,690	11.8%
45–49	1,439	10.0%
50–54	1,158	8.1%
55–59	761	5.3%
60–64	483	3.4%
65–69	278	1.9%
70–74	139	1.0%
75–79	43	0.3%
80+	13	0.1%
Total	**14,340**	**100.0%**

Source: table created with data from the SurvStat@RKI database of the Robert Koch Institute. Retrieved from https://survstat.rki.de [15].

Table S7 : Malaria cases reported to the RKI – gender distribution (2003–2022)

Year	Male		Female		Diverse		Total	
	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage
2003	553	70.18%	235	29.82%	0	0.00%	788	100.00%
2004	484	70.45%	203	29.55%	0	0.00%	687	100.00%
2005	438	70.19%	186	29.81%	0	0.00%	624	100.00%
2006	379	66.84%	188	33.16%	0	0.00%	567	100.00%
2007	364	67.66%	174	32.34%	0	0.00%	538	100.00%
2008	404	73.59%	145	26.41%	0	0.00%	549	100.00%
2009	367	70.04%	157	29.96%	0	0.00%	524	100.00%
2010	434	68.45%	200	31.55%	0	0.00%	634	100.00%
2011	384	68.21%	179	31.79%	0	0.00%	563	100.00%
2012	378	69.10%	169	30.90%	0	0.00%	547	100.00%
2013	448	70.77%	185	29.23%	0	0.00%	633	100.00%
2014	761	76.41%	235	23.59%	0	0.00%	996	100.00%
2015	815	77.18%	241	22.82%	0	0.00%	1056	100.00%
2016	698	73.17%	256	26.83%	0	0.00%	954	100.00%
2017	638	67.30%	310	32.70%	0	0.00%	948	100.00%
2018	626	70.89%	257	29.11%	0	0.00%	883	100.00%
2019	662	67.41%	320	32.59%	0	0.00%	982	100.00%
2020	246	67.77%	117	32.23%	0	0.00%	363	100.00%
2021	422	69.64%	184	30.36%	0	0.00%	606	100.00%
2022	519	68.56%	237	31.31%	1	0.13%	757	100.00%
Total	**10020**	**70.57%**	**4178**	**29.42%**	**1**	**0.01%**	**14199**	**100.00%**
Min	246	66.84%	117	22.82%	0	0.00%	363	100.00%
Max	815	77.18%	320	33.16%	1	0.13%	1056	100.00%
Mean	501	70.19%	208.9	29.80%	0.05	0.01%	709.95	100.00%

Source: Table created with data from the SurvStat@RKI database of the Robert Koch Institute. Retrieved from https://survstat.rki.de [15].

Table S8: Malaria cases reported to the RKI – absolute frequencies of the species

Year	*P. falciparum*	*P. knowlesi*	*P. malariae*	*P. ovale*	*P. vivax*	M. tertiana without specification	Mixed infections	Total
2003	613	0	17	28	85	8	27	778
2004	516	0	12	20	82	12	26	668
2005	466	0	15	21	73	8	19	602
2006	426	0	14	20	62	11	18	551
2007	427	0	12	14	41	8	25	527
2008	441	0	13	14	46	3	17	534
2009	410	0	16	14	42	9	22	513
2010	511	0	16	14	45	9	20	615
2011	409	0	13	14	58	16	22	532
2012	389	1	22	14	73	14	20	533
2013	497	2	17	16	45	13	23	613
2014	535	2	23	37	292	46	30	965
2015	600	1	29	24	305	41	26	1,026
2016	665	0	28	25	168	23	21	930
2017	749	1	35	33	73	9	29	929
2018	702	1	33	45	50	12	20	863
2019	820	0	34	32	39	17	19	961
2020	240	2	20	38	33	7	6	346
2021	525	0	16	19	16	3	15	594
2022	645	0	31	29	19	6	16	746
Total	**10,586**	**10**	**416**	**471**	**1,647**	**275**	**421**	**13,826**
Min	240	0	12	14	16	3	6	346
Max	820	2	35	45	305	46	30	1,026
Mean	529.3	0.5	20.8	23.55	82.35	13.75	21.05	691.3

Source: Table created with data from the SurvStat@RKI database of the Robert Koch Institute. Retrieved from https://survstat.rki.de [15].

Table S9: Malaria cases reported to the RKI – relative frequencies of the species

Year	*P. falciparum*	*P. knowlesi*	*P. malariae*	*P. ovale*	*P. vivax*	M. tertiana without specification	Mixed infection	Total
2003	78.8%	0.0%	2.2%	3.6%	10.9%	1.0%	3.5%	**100.0%**
2004	77.2%	0.0%	1.8%	3.0%	12.3%	1.8%	3.9%	**100.0%**
2005	77.4%	0.0%	2.5%	3.5%	12.1%	1.3%	3.2%	**100.0%**
2006	77.3%	0.0%	2.5%	3.6%	11.3%	2.0%	3.3%	**100.0%**
2007	81.0%	0.0%	2.3%	2.7%	7.8%	1.5%	4.7%	**100.0%**
2008	82.6%	0.0%	2.4%	2.6%	8.6%	0.6%	3.2%	**100.0%**
2009	79.9%	0.0%	3.1%	2.7%	8.2%	1.8%	4.3%	**100.0%**
2010	83.1%	0.0%	2.6%	2.3%	7.3%	1.5%	3.3%	**100.0%**
2011	76.9%	0.0%	2.4%	2.6%	10.9%	3.0%	4.1%	**100.0%**
2012	73.0%	0.2%	4.1%	2.6%	13.7%	2.6%	3.8%	**100.0%**
2013	81.1%	0.3%	2.8%	2.6%	7.3%	2.1%	3.8%	**100.0%**
2014	55.4%	0.2%	2.4%	3.8%	30.3%	4.8%	3.1%	**100.0%**
2015	58.5%	0.1%	2.8%	2.3%	29.7%	4.0%	2.5%	**100.0%**
2016	71.5%	0.0%	3.0%	2.7%	18.1%	2.5%	2.3%	**100.0%**
2017	80.6%	0.1%	3.8%	3.6%	7.9%	1.0%	3.1%	**100.0%**
2018	81.3%	0.1%	3.8%	5.2%	5.8%	1.4%	2.3%	**100.0%**
2019	85.3%	0.0%	3.5%	3.3%	4.1%	1.8%	2.0%	**100.0%**
2020	69.4%	0.6%	5.8%	11.0%	9.5%	2.0%	1.7%	**100.0%**
2021	88.4%	0.0%	2.7%	3.2%	2.7%	0.5%	2.5%	**100.0%**
2022	86.5%	0.0%	4.2%	3.9%	2.5%	0.8%	2.1%	**100.0%**
Total (2003–2022)	**76.6%**	**0.1%**	**3.0%**	**3.4%**	**11.9%**	**2.0%**	**3.0%**	**100.0%**
Min	55.4%	0.0%	1.8%	2.3%	2.5%	0.5%	1.7%	100.0%
Max	88.4%	0.6%	5.8%	11.0%	30.3%	4.8%	4.7%	100.0%
Mean	77.3%	0.1%	3.0%	3.5%	11.0%	1.9%	3.1%	100.0%

Source: Table created with data from the SurvStat@RKI database of the Robert Koch Institute. Retrieved from https://survstat.rki.de [15].

Table S10: Frequencies of the reported co-infections (at the Institute for Laboratory Medicine)

Co-Infection	Count
No Co-Infection	27
Covid-19	2
Pneumonia	2
Osteomyelitis	1
Herpes Labialis	1
Pityriasis Versicolor	1
Urinary Tract Infection	1
Pyelonephritis	1
Maxillary Sinusitis	1
Rhinitis	1
Mastoiditis	1
Total	39

Table S11: Malaria cases by continent of infection (Institute for Laboratory Medicine)

Continent	Count	Percentage
Africa	35	87.5
Asia	3	7.5
Europe	2	5.0
Total	40	100.0

Table S12: Malaria cases by country of infection (Institute for Laboratory Medicine)

Country	Count	Percentage
Cameroon	9	22.5
Ghana	5	12.5
Nigeria	5	12.5
Africa (no specification)	3	7.5
Togo	3	7.5
Angola	2	5.0
Germany	2	5.0
China	1	2.5
Gambia	1	2.5
Guinea	1	2.5
Kenya	1	2.5
Mali	1	2.5
Pakistan	1	2.5
Sierra Leone	1	2.5
Southeast Asia (no specification)	1	2.5
Tanzania	1	2.5
West Africa (no specification)	1	2.5
Central Africa (no specification)	1	2.5
Total	40	100.0

Table S13: Malaria cases reported to the RKI with Africa as country of origin

Year	African countries	
	Count	Percentage
2003	566	87
2004	502	87
2005	438	88
2006	361	86
2007	325	86
2008	353	88
2009	313	92
2010	402	92
2011	336	89
2012	303	83
2013	428	95
2014	578	96
2015	585	92
2016	570	90
2017	608	93
2018	616	95
2019	661	97
2020	256	94
2021	425	99
2022	554	98

Source: Table created with data from the Epidemiological Yearbooks of Notifiable Infectious Diseases, 2003–2022, published by the Robert Koch Institute [7], [16], [17], [18], [19], [20], [21], [22], [23], [24], [25], [26], [27], [28], [29], [30], [31], [32], [33], [34]. Retrieved from https://edoc.rki.de/handle/176904/41.

Table S14: Most frequently reported countries of malaria infection (according to the RKI), 2003–2007

2003		2004		2005		2006		2007	
Ghana	21%	Ghana	21%	Ghana	21%	Ghana	19%	Nigeria	18%
Nigeria	12%	Nigeria	13%	Nigeria	15%	Nigeria	15%	Ghana	17%
Kenya	10%	Cameroon	9%	Cameroon	7%	Cameroon	12%	Cameroon	9%
Cameroon	10%	Kenya	8%	Kenya	7%	Kenya	5%	Togo	6%
Gambia	4%	Uganda	4%	West Africa (No Specification)	6%	Mozambique	3%	Ivory Coast	5%
West Africa (no specification)	3%	Gambia	3%	Togo	4%	Togo	3%	West Africa (no specification)	4%
Indonesia	3%	Togo	3%	Ivory Coast	2%	West Africa (no specification)	3%	Kenya	4%
Senegal	2%	Sierra Leone	3%	Congo	2%	Ivory Coast	3%	Burkina Faso	3%
Togo	2%	Benin	2%	Uganda	2%	Benin	2%	India	3%
Uganda	2%	Ivory Coast	2%	Mozambique	2%	Brazil	2%	Congo	3%
Other	30%	West Africa (no specification)	2%	Other	30%	Guinea	2%	Other	28%
		Other	30%			Other	29%		

Source: Table created with data from the Epidemiological Yearbooks of Notifiable Infectious Diseases, 2003–2007, published by the Robert Koch Institute [7], [16], [17], [18], [19], [20]. Retrieved from https://edoc.rki.de/handle/176904/41.

Table S15: Most frequently reported countries of malaria infection (according to the RKI), 2008–2012

2008		2009		2010		2011		2012	
Nigeria	17%	Ghana	21%	Ghana	18%	Ghana	18%	Nigeria	20%
Ghana	14%	Nigeria	17%	Nigeria	16%	Cameroon	11%	Ghana	14%
Togo	11%	Cameroon	8%	Cameroon	10%	Nigeria	11%	Pakistan	9%
Cameroon	9%	West Africa (no specification)	8%	Togo	9%	Togo	7%	Cameroon	7%
Ivory Coast	5%	Togo	8%	West Africa (no specification)	5%	West Africa (no specification)	5%	India	5%
West Africa (No Specification)	4%	Ivory Coast	4%	Kenya	4%	India	5%	Togo	5%
Gambia	3%	Benin	3%	Ivory Coast	3%	Kenya	4%	Uganda	4%
Uganda	3%	Uganda	2%	India	3%	Uganda	3%	West Africa (no specification)	3%
India	3%	Congo	2%	Uganda	3%	Gambia	3%	Ivory Coast	3%
Kenya	3%	Kenya	2%	Benin	3%	Sierra Leone	3%	Sierra Leone	3%
Other	28%	Mozambique	2%	Other	27%	Ivory Coast	3%	Other	27%
		India	2%			Guinea	3%		
		Other	22%			Other	25%		

Source: Table created with data from the Epidemiological Yearbooks of Notifiable Infectious Diseases, 2008–2012, published by the Robert Koch Institute [7], [21], [22], [23], [24], [25]. Retrieved from https://edoc.rki.de/handle/176904/41.

Table S16: Most frequently reported countries of malaria infection (according to the RKI), 2013–2017

2013		2014		2015		2016		2017	
Ghana	17%	Eritrea	15%	Nigeria	13%	Nigeria	19%	Nigeria	21%
Cameroon	15%	Nigeria	13%	Eritrea	13%	Cameroon	14%	Cameroon	14%
Nigeria	14%	Ghana	12%	Ghana	12%	Ghana	10%	Ghana	11%
Togo	7%	Cameroon	11%	Cameroon	11%	Togo	5%	Togo	8%
Uganda	5%	Togo	9%	Togo	6%	Afghanistan	4%	Benin	4%
Congo	4%	Kenya	5%	Kenya	5%	Kenya	4%	Kenya	4%
Sierra Leone	3%	Ivory Coast	3%	Tanzania	3%	Democratic Rep. Congo	4%	Uganda	3%
Burkina Faso	3%	Sierra Leone	2%	Uganda	3%	Ivory Coast	3%	Sierra Leone	3%
Guinea	3%	Sudan	2%	Democratic Rep. Congo	3%	Pakistan	3%	Ivory Coast	3%
Ivory Coast	3%	Benin	2%	Pakistan	2%	Sierra Leone	3%	Democratic Rep. Congo	3%
Gambia	3%	Other	27%	Other	29%	Other	31%	Mozambique	3%
Other	25%							Other	25%

Source: Table created with data from the Epidemiological Yearbooks of Notifiable Infectious Diseases, 2013–2017, published by the Robert Koch Institute [7], [26], [27], [28], [29], [30]. Retrieved from https://edoc.rki.de/handle/176904/41.

Table S17: Most frequently reported countries of malaria infection (according to the RKI), 2018–2022

2018		2019		2020		2021		2022	
Nigeria	21%	Nigeria	18%	Cameroon	13%	Cameroon	22%	Cameroon	20%
Cameroon	17%	Cameroon	14%	Nigeria	11%	Nigeria	20%	Nigeria	15%
Ghana	13%	Ghana	11%	Kenya	10%	Ghana	11%	Ghana	10%
Togo	9%	Togo	10%	Uganda	8%	Togo	7%	Uganda	7%
Ivory Coast	5%	Uganda	7%	Ghana	8%	Benin	5%	Togo	6%
Guinea	3%	Kenya	5%	Togo	6%	Guinea	5%	Guinea	6%
Burkina Faso	3%	Ivory Coast	4%	Democratic Rep. Congo	5%	Ivory Coast	4%	Sierra Leone	5%
Benin	2%	Democratic Rep. Congo	3%	Ivory Coast	4%	Uganda	4%	Democratic Rep. Congo	3%
Sierra Leone	2%	Sierra Leone	3%	Tanzania	4%	Democratic Rep. Congo	4%	Kenya	3%
Uganda	2%	Guinea	3%	Sierra Leone	3%	Sierra Leone	3%	Ivory Coast	2%
Other	23%	Other	22%	Benin	3%	Other	15%	Other	23%
				Other	26%				

Source: Table created with data from the Epidemiological Yearbooks of Notifiable Infectious Diseases, 2018–2022, published by the Robert Koch Institute [7], [31], [32], [33], [34]. Retrieved from https://edoc.rki.de/handle/176904/41.

Table S18: Reasons for travel (Institute for Laboratory Medicine)

Reason for travel	Count	Percentage
Visiting friends and relatives (VFR)	6	54.5%
Refugee	2	18.2%
Vacation/tourism	1	9.1%
Other reasons	2	18.2%
Total	11	100.0%

Table S19: Laboratory results of the malaria patients

Laboratory parameter	Data Obtainable	Symptom present		Symptom not present	
	Count	Count	Percentage	Count	Percentage
CRP elevated >5 mg/L	38	38	100.0%	0	0.0%
PCT elevated >0.5 µg/L	16	16	100.0%	0	0.0%
Thrombocytopenia ♂<166 cells/nL ♀<173 cells/nL	42	41	97.6%	1	2.4%
Anaemia ♂<13.5 g/dL ♀<11.9 g/dL	41	38	92.7%	3	7.3%
Hyperbilirubinaemia >1.10 mg/dL	32	25	78.1%	7	21.9%
LDH elevated >250 U/L	36	25	69.4%	11	30.6%
Sodium reduced <136 mmol/L	34	19	55.9%	15	44.1%
Leukocytes reduced ♂<3.91 cells/nL ♀<4.49 cells/nL	35	18	51.4%	17	48.6%
Potassium reduced <3.40 mmol/L	35	18	51.4%	17	48.6%
Creatinine elevated ♂>1.20 mg/dL ♀>0.90 mg/dL	35	17	48.6%	18	51.4%
Potassium elevated >4.50 mmol/L	34	12	35.3%	22	64.7%
Leukocytes elevated ♂>10.90 cells/nL ♀>12.68 cells/nL	35	8	22.9%	27	77.1%
Sodium elevated >145 mmol/L	34	5	14.7%	29	85.3%

Table S20: Relationship between elevated creatinine levels and disease course

Disease course/creatinine level		Creatinine elevated	Creatinine not elevated	Total
Severe	Count	**10**	**2**	12
	Expected count	**5.8**	**6.2**	12.0
Non-severe	Count	**7**	**16**	23
	Expected count	**11.2**	**11.8**	23.0
Total	Count	17	18	**35**
	Expected count	17.0	18.0	**35.0**
Pearson's chi-squared test: p-value=0.003				

Table S21: Relationship between elevated LDH levels and disease course

Disease course/LDH level		LDH elevated	LDH not elevated	Total
Severe	Count	12	0	12
	Expected count	8.2	3.8	12.0
Non-severe	Count	12	11	23
	Expected count	15.8	7.2	23.0
Total	Count	24	11	35
	Expected count	24.0	11.0	35.0
Fisher's exact test: p-value=0.005				

Table S22: Fulfilment of DTG criteria in the severe malaria cases

Criteria (DTG)	Fulfilled		Not fulfilled		Data not obtainable	
	Count	%	Count	%	Count	%
Parasitaemia with *P. falciparum* >250,000/µL (≥ 5%)	10	58.8	7	41.2	0	0.0
Diminished consciousness, epileptic seizures	6	35.3	9	52.9	2	11.8
Bilirubin >3 mg/dL (50 µmol/L) with parasitaemia >100,000/µL	6	35.3	5	29.4	6	35.3
Acidosis or increased lactate (Base excess <8 mmol/L, lactate ≥5 mmol/L)	4	23.5	7	41.2	6	35.3
Severe anaemia <7 g/dL (<4.8 mmol/L) in adults (according to WHO)	4	23.5	8	47.1	5	29.4
Shock or hypotension plus **tachycardia** (despite volume therapy)	3	17.6	10	58.8	4	23.5
Prostration (incapability to sit, stand, or walk)	3	17.6	11	64.7	3	17.6
Respiratory insufficiency (surrogate marker: peripheral saturation SpO_2<92%)	2	11.8	12	70.6	3	17.6
Urine excretion <400 mL/24h; **haemoglobinuria**	1	5.9	12	70.6	4	23.5
Hyperkalaemia: Potassium >5.5 mmol/L	1	5.9	10	58.8	6	35.3
Creatinine >2.5 mg/dL (>221 µmol/L) or rapidly rising creatinine levels	1	5.9	10	58.8	6	35.3
Spontaneous bleeding	0	0.0	14	82.4	3	17.6
Hypoglycaemia <40 mg/dL (<2.22 mmol/L)	0	0.0	11	64.7	6	35.3

Table S23: Further complications in the severe malaria cases

Complication	Present		Not Present		Data not obtainable	
	Count	Percentage	Count	Percentage	Count	Percentage
Renal insufficiency	6	35.3	9	52.9	2	11.8
Exsiccosis	6	35.3	9	52.9	2	11.8
Liver Insufficiency	4	23.5	11	64.7	2	11.8
Disseminated intravascular coagulation (DIC)	2	11.8	13	76.5	2	11.8
Cerebral oedema	2	11.8	13	76.5	2	11.8
Encephalopathy	2	11.8	13	76.5	2	11.8
Seizure	2	11.8	13	76.5	2	11.8
Coma (with ventilation requirement)	2	11.8	13	76.5	2	11.8
Mild disturbances of consciousness (confusion, dizziness)	2	11.8	13	76.5	2	11.8
Worsening condition despite treatment	2	11.8	13	76.5	2	11.8
Somnolence	1	5.9	14	82.4	2	11.8

Table S24: Relationship between gender and disease course

Disease course/gender		Male	Female	Total
Severe	Count	**9**	**8**	17
	Expected count	**8.925**	**8.075**	17.0
Non-severe	Count	**12**	**11**	23
	Expected count	**12.075**	**10.925**	23.0
Total	Count	21	19	**40**
	Expected count	21.0	19.0	**40.0**
Pearson's chi-squared test: p-value=0.962				

Table S25: Relationship between age and disease course

Disease course/age		≤ 45 Years	>45 Years	Total
Severe	Count	**9**	**8**	17
	Expected count	**12.3**	**4.7**	17.0
Non-severe	Count	**20**	**3**	23
	Expected count	**16.7**	**6.3**	23.0
Total	Count	29	11	**40**
	Expected count	29.0	11.0	**40.0**
Fisher's exact test: p-value=0.030				

Table S26: Co-infections in the severe malaria cases

Co-infection	Count	Percentage
Covid-19	2	11.8
Rhinitis	1	5.9
Mastoiditis	1	5.9
Osteomyelitis	1	5.9
No co-infection	9	52.9
Not obtainable	3	17.6
Total	17	100.0

Attachment 1 to: *Kienberger V, Müller O, Hunfeld KP. Travel-associated malaria in the Rhine-Main area: An evaluation of the cases diagnosed at the Institute for Laboratory Medicine, Microbiology and Infection Control at the Northwest Medical Centre in Frankfurt/Main, Germany, from 2003 to 2022. GMS Z Forder Qualitatssich Med Lab. 2025;16:Doc02. DOI: 10.3205/lab000050, URN: urn:nbn:de:0183-lab0000508*

Table S27: Relationship between co-infections and disease course

Disease course/co-infection		Co-infection	No co-infection	Total
Severe	Count	**5**	**9**	14
	Expected count	**4.2**	**9.8**	14.0
Non-severe	Count	**6**	**17**	23
	Expected count	**6.8**	**16.2**	23.0
Total	Count	11	26	**37**
	Expected count	11.0	26.0	**37.0**
Fisher's exact test: p-value=0.713				

Table S28: Follow-up treatment for patients treated with artesunate

Follow-up treatment	Count	Percentage
Atovaquone/proguanil	6	60.0
Artemether/lumefantrine	2	20.0
No follow-up treatment	1	10.0
No information (due to patient transfer)	1	10.0
Total	10	100.0

Table S29: Treatment of severe malaria in patients without artesunate therapy

Medication	Count	Percentage
Artemether/lumefantrine	5	71.4
Atovaquone/proguanil	2	28.6
Total	7	100.0

Table S30: Atovaquone/proguanil and artemether/lumefantrine – first and second half of the observation period

Years	Total cases	Treated with atovaquone/proguanil	Treated with artemether/lumefantrine
2003–2012	13	13 (100.0%)	0 (0.0%)
2013–2022	27	12 (44.4%)	12 (44.4%)