

KAZAKHSTAN
Last Updated: 2006-02-14

Level	Date	Region and sample descriptor	Sex	Age (years)	Sample size	Haemoglobin (g/L)						Mean	SD	Method	Reference	Notes		
						Proportion (%) of population with haemoglobin below:										General	Line	
						70	100	110	115	120	130							
S	2000	Kzyl-Orda Region: SAC: Total	B	6.00- 15.99	809	0.1						119	10	D	1492	*	1	
		Kzyl-Orda Region: SAC by age	B	6.00- 9.99	301					60.1								
		Kzyl-Orda Region: SAC by age	B	10.00- 12.99	275					43.3								
		Kzyl-Orda Region: SAC by age	B	13.00- 15.99	233													2
		Kzyl-Orda Region: SAC by district: Kazalinsk	B	6.00- 15.99	380													3
		Kzyl-Orda Region: SAC by district: Zhanakorgan	B	6.00- 15.99	429													4
N	1999	Women: Total	F	15.00- 49.99	2269	1.2								B	2675	*	5	
		Children: Total	B	NS- 4.99	574	1.4		36.3										6
		Women by age	F	15.00- 19.99	352	0.0												7
		Women by age	F	20.00- 24.99	334	0.8												8
		Women by age	F	25.00- 29.99	351	1.4												9
		Women by age	F	30.00- 34.99	323	0.4												10
		Women by age	F	35.00- 39.99	352	2.4												11
		Women by age	F	40.00- 44.99	297	1.7												12
		Women by age	F	45.00- 49.99	259	2.0												13
		Women by area: Urban	F	15.00- 49.99	1256	0.9												14
		Women by area: Rural	F	15.00- 49.99	1012	1.6												15
		Women by region: Almaty City	F	15.00- 49.99	127	0.7												16
		Women by region: South	F	15.00- 49.99	731	0.2												17
		Women by region: West	F	15.00- 49.99	285	3.1												18
		Women by region: Central	F	15.00- 49.99	207	1.1												19
		Women by region: North	F	15.00- 49.99	605	1.9												20
		Women by region: East	F	15.00- 49.99	313	0.9												21
		Children by area: Urban	B	NS- 4.99	241	0.9				30.1								22
		Children by area: Rural	B	NS- 4.99	333	1.7				40.3								23
		Children by region: Almaty City	B	NS- 4.99	44	0.0				40.9								24
		Children by region: South	B	NS- 4.99	198	1.4				27.8								25
		Children by region: West	B	NS- 4.99	107	2.8				59.4								26
		Children by region: Central	B	NS- 4.99	83	3.3				58.5								27
		Children by region: North	B	NS- 4.99	56	0.0				38.8								28
		Children by region: East	B	NS- 4.99	86	0.8				25.3								29
		N	1995	Women: Total	F	15.00- 49.99	3684	1.1								B	2294	*
Pre-SAC: Total	B			NS- 2.99	714	5.5			69.2								31	
Women by age	F			15.00- 19.99	657	0.4											32	

KAZAKHSTAN

Last Updated: 2006-02-14

Level	Date	Region and sample descriptor	Sex	Age (years)	Sample size	Haemoglobin (g/L)						Mean	SD	Method	Reference	Notes				
						Proportion (%) of population with haemoglobin below:										General	Line			
						70	100	110	115	120	130									
N	1995	Women by age	F	20.00- 24.99	557	0.6								B	2294		33			
		Women by age	F	25.00- 29.99	514	0.9													34	
		Women by age	F	30.00- 34.99	539	2.1														35
		Women by age	F	35.00- 39.99	552	1.5														36
		Women by age	F	40.00- 44.99	521	0.8														37
		Women by age	F	45.00- 49.99	344	2.0														38
		Women by area: Urban	F	15.00- 49.99	2058	0.7														39
		Women by area: Rural	F	15.00- 49.99	1626	1.7														40
		Women by region: Almaty City	F	15.00- 49.99	249	1.1														41
		Women by region: South	F	15.00- 49.99	1177	0.8														42
		Women by region: West	F	15.00- 49.99	459	2.5														43
		Women by region: Central	F	15.00- 49.99	354	0.7														44
		Women by region: North and East	F	15.00- 49.99	1445	1.1														45
		Pre-SAC by sex	F	NS- 2.99	384	4.5			66.8											
		Pre-SAC by sex	M	NS- 2.99	331	6.6			72.0											
		Pre-SAC by age	B	NS- 0.49	103	1.7			64.9											
		Pre-SAC by age	B	0.50- 0.99	126	2.8			76.3											
		Pre-SAC by age	B	1.00- 1.99	264	7.2			76.0											
		Pre-SAC by age	B	2.00- 2.99	222	6.6			58.9											
		Pre-SAC by area: Urban	B	NS- 2.99	293	4.5			63.7											
		Pre-SAC by area: Rural	B	NS- 2.99	422	6.1			72.9											
		Pre-SAC by region: Almaty City	B	NS- 2.99	29	1.5			47.7											
		Pre-SAC by region: South	B	NS- 2.99	319	7.4			72.9											
		Pre-SAC by region: West	B	NS- 2.99	93	7.7			81.0											
		Pre-SAC by region: Central	B	NS- 2.99	73	5.1			66.8											
		Pre-SAC by region: North and East	B	NS- 2.99	200	2.0			61.6											
S	1994 -1995	Kzyl-Orda Region: NPW: Total	F	18.00- 45.99	3625	1.2				40.2	119	17	B	154	*					
		Kzyl-Orda Region: NPW by district: Kazalinsk	F	18.00- 45.99	1025						116	16								46
		Kzyl-Orda Region: NPW by district: Djalagash	F	18.00- 45.99	1394						118	17								47
		Kzyl-Orda Region: NPW by district: Zhanakorgan	F	18.00- 45.99	1206						122	17								48
		Kzyl-Orda Region: NPW by age and district: Kazalin	F	18.00- 24.99	221						117	14								49
		Kzyl-Orda Region: NPW by age and district: Kazalin	F	25.00- 29.99	210						118	13								50
		Kzyl-Orda Region: NPW by age and district: Kazalin	F	30.00- 34.99	206						115	16								51
		Kzyl-Orda Region: NPW by age and district: Kazalin	F	35.00- 39.99	215						115	18								52
		Kzyl-Orda Region: NPW by age and district: Kazalin	F	40.00- 45.99	173						115	19								53

KAZAKHSTAN
Last Updated: 2006-02-14

Level	Date	Region and sample descriptor	Sex	Age (years)	Sample size	Haemoglobin (g/L)						Mean	SD	Method	Reference	Notes	
						Proportion (%) of population with haemoglobin below:										General	Line
						70	100	110	115	120	130						
S	1994 -1995	Kzyl-Orda Region: NPW by age and district: Djalaga	F	18.00- 24.99	281							120	15	B	154		54
		Kzyl-Orda Region: NPW by age and district: Djalaga	F	25.00- 29.99	243							119	15			55	
		Kzyl-Orda Region: NPW by age and district: Djalaga	F	30.00- 34.99	281							117	18			56	
		Kzyl-Orda Region: NPW by age and district: Djalaga	F	35.00- 39.99	260							118	17			57	
		Kzyl-Orda Region: NPW by age and district: Djalaga	F	40.00- 45.99	329							118	18			58	
		Kzyl-Orda Region: NPW by age and district: Zhanak	F	18.00- 24.99	281							124	16			59	
		Kzyl-Orda Region: NPW by age and district: Zhanak	F	25.00- 29.99	219							121	17			60	
		Kzyl-Orda Region: NPW by age and district: Zhanak	F	30.00- 34.99	244							121	15			61	
		Kzyl-Orda Region: NPW by age and district: Zhanak	F	35.00- 39.99	249							119	19			62	
		Kzyl-Orda Region: NPW by age and district: Zhanak	F	40.00- 45.99	213							122	18			63	
		S	1994 -1995	Kzyl-Orda Region: Children: Total	B	0.50- 4.99	2024			50.1						106	
Kzyl-Orda Region: Children by sex	F			0.50- 4.99	993							107	16	64			
Kzyl-Orda Region: Children by sex	M			0.50- 4.99	1031							106	17	65			
Kzyl-Orda Region: Children by age	B			0.50- 0.99	327			60.2									
Kzyl-Orda Region: Children by age	B			1.00- 1.99	424			79.2									
Kzyl-Orda Region: Children by age	B			2.00- 2.99	463			58.1									
Kzyl-Orda Region: Children by age	B			3.00- 3.99	417			30.7									
Kzyl-Orda Region: Children by age	B			4.00- 4.99	393			21.6									
Kzyl-Orda Region: Children by sex and age	F			0.50- 0.99	175							106	13	66			
Kzyl-Orda Region: Children by sex and age	M			0.50- 0.99	152							103	14	67			
Kzyl-Orda Region: Children by sex and age	F			1.00- 1.49	99							96	15	68			
Kzyl-Orda Region: Children by sex and age	M			1.00- 1.49	120							96	16	69			
Kzyl-Orda Region: Children by sex and age	F			1.50- 1.99	95							96	16	70			
Kzyl-Orda Region: Children by sex and age	M			1.50- 1.99	110							95	16	71			
Kzyl-Orda Region: Children by sex and age	F			2.00- 2.49	118							101	16	72			
Kzyl-Orda Region: Children by sex and age	M			2.00- 2.49	112							98	17	73			
Kzyl-Orda Region: Children by sex and age	F			2.50- 2.99	109							105	17	74			
Kzyl-Orda Region: Children by sex and age	M			2.50- 2.99	124							107	15	75			
Kzyl-Orda Region: Children by sex and age	F			3.00- 3.49	95							109	16	76			
Kzyl-Orda Region: Children by sex and age	M			3.00- 3.49	115							111	16	77			
Kzyl-Orda Region: Children by sex and age	F			3.50- 3.99	111							114	16	78			
Kzyl-Orda Region: Children by sex and age	M	3.50- 3.99	96							115	15	79					
Kzyl-Orda Region: Children by sex and age	F	4.00- 4.49	81							114	14	80					
Kzyl-Orda Region: Children by sex and age	M	4.00- 4.49	102							116	15	81					
Kzyl-Orda Region: Children by sex and age	F	4.50- 4.99	110							117	12	82					

KAZAKHSTAN
Last Updated: 2006-02-14

Level	Date	Region and sample descriptor	Sex	Age (years)	Sample size	Haemoglobin (g/L)						Reference	Notes				
						Proportion (%) of population with haemoglobin below:							Mean	SD	Method	General	Line
						70	100	110	115	120	130						
S	1994 -1995	Kzyl-Orda Region: Children by sex and age	M	4.50- 4.99	100							119	11	B	40	83	
		Kzyl-Orda Region: Children by district: Kazalinsk	B	0.50- 4.99	596			60.7									
		Kzyl-Orda Region: Children by district: Djalagash	B	0.50- 4.99	815			45.3									
		Kzyl-Orda Region: Children by district: Zhanakorgan	B	0.50- 4.99	613			46.3									
		Kzyl-Orda Region: Children by age and district: Kaz	B	0.50- 0.99	96			77.1									
		Kzyl-Orda Region: Children by age and district: Kaz	B	1.00- 1.99	120			85.8									
		Kzyl-Orda Region: Children by age and district: Kaz	B	2.00- 2.99	139			69.8									
		Kzyl-Orda Region: Children by age and district: Kaz	B	3.00- 3.99	107			45.8									
		Kzyl-Orda Region: Children by age and district: Kaz	B	4.00- 4.99	134			29.1									
		Kzyl-Orda Region: Children by age and district: Djal	B	0.50- 0.99	128			56.3									
		Kzyl-Orda Region: Children by age and district: Djal	B	1.00- 1.99	169			73.4									
		Kzyl-Orda Region: Children by age and district: Djal	B	2.00- 2.99	191			52.9									
		Kzyl-Orda Region: Children by age and district: Djal	B	3.00- 3.99	184			25.5									
		Kzyl-Orda Region: Children by age and district: Djal	B	4.00- 4.99	143			17.5									
		Kzyl-Orda Region: Children by age and district: Zha	B	0.50- 0.99	103			49.5									
		Kzyl-Orda Region: Children by age and district: Zha	B	1.00- 1.99	135			80.7									
		Kzyl-Orda Region: Children by age and district: Zha	B	2.00- 2.99	133			53.4									
		Kzyl-Orda Region: Children by age and district: Zha	B	3.00- 3.99	126			25.4									
Kzyl-Orda Region: Children Zhanakorgan	B	4.00- 4.99	116			18.1											

NOTES

KAZAKHSTAN

Reference No: 1492

General Notes: *Study in 2 districts (Kazalinsk, Zhanakorgan) in the Kzyl-Orda Region; dates of survey and sample sizes for disaggregated data by age provided by investigator; method: automated cell counter (MEK-5207); sampling: from the full list of villages, nine villages were selected from Kazalinsk and four from Zhanakorgan, villages were selected as being representative of the geographical distribution of villages in each district, equal numbers of boys and girls born between 1985 and 1993 inclusive (6-15 yrs of age) were randomly selected according to birth yr from the list of children at the selected villages, 815 children were enrolled (17.5% of children born in the period 1985-1993).*

Line note 1 Prevalence of anaemia 49.8% (Hb <120 g/L females 6-15 yrs, males 6-14 yrs, Hb <130 g/L males 15 yrs); 407 males+402 females.

Line note 2 Prevalence of anaemia 44.2% (Hb <120 g/L females 13-15 yrs, males 13-14 yrs, Hb <130 g/L males 15 yrs).

Line note 3 Prevalence of anaemia 62.1% (Hb <120 g/L females 6-15 yrs, males 6-14 yrs, Hb <130 g/L males 15 yrs).

Line note 4 Prevalence of anaemia 38.9% (Hb <120 g/L females 6-15 yrs, males 6-14 yrs, Hb <130 g/L males 15 yrs).

Reference No: 2675

General Notes: *Six geographic survey regions were defined: Almaty City, South Region (Almatinskaya, Zhambylskaya, Kyzylordinskaya, South Kazakhstanskaya), West Region (Aktyubinskaya, Atyrauskaya, Mangistauskaya, West Kazakhstanskaya), North Region (Akmolinskaya, Kostnaiskaya, Pavlodarskaya, North Kazakhstanskaya), Central Region (Karagandinskaya), East Region (East Kazakhstanskaya); sampling: stratified two-stage sampling process (1. blocks/villages; 2. households), in each selected household women aged 15-49 yrs were identified and interviewed; women are mothers of the children; sample not national representative for children; Hb determination in women only for subsample (every 2nd household).*

Line note 5 Prevalence of anaemia 35.5% (Hb <110 g/L PW, Hb <120 g/L NPW); disaggregated data by education, ethnicity, body mass index, reproductive history.

Line note 6 Unweighted number of children; disaggregated data by education of mother, ethnicity.

Line note 7 Prevalence of anaemia 31.8% (Hb <110 g/L PW, Hb <120 g/L NPW).

Line note 8 Prevalence of anaemia 33.5% (Hb <110 g/L PW, Hb <120 g/L NPW).

Line note 9 Prevalence of anaemia 31.7% (Hb <110 g/L PW, Hb <120 g/L NPW).

Line note 10 Prevalence of anaemia 37.5% (Hb <110 g/L PW, Hb <120 g/L NPW).

Line note 11 Prevalence of anaemia 41.0% (Hb <110 g/L PW, Hb <120 g/L NPW).

Line note 12 Prevalence of anaemia 41.9% (Hb <110 g/L PW, Hb <120 g/L NPW).

Line note 13 Prevalence of anaemia 31.1% (Hb <110 g/L PW, Hb <120 g/L NPW).

Line note 14 Prevalence of anaemia 34.0% (Hb <110 g/L PW, Hb <120 g/L NPW).

Line note 15 Prevalence of anaemia 37.4% (Hb <110 g/L PW, Hb <120 g/L NPW).

Line note 16 Prevalence of anaemia 23.8% (Hb <110 g/L PW, Hb <120 g/L NPW).

Line note 17 Prevalence of anaemia 25.3% (Hb <110 g/L PW, Hb <120 g/L NPW).

Line note 18 Prevalence of anaemia 45.7% (Hb <110 g/L PW, Hb <120 g/L NPW).

Line note 19 Prevalence of anaemia 37.4% (Hb <110 g/L PW, Hb <120 g/L NPW).

Line note 20 Prevalence of anaemia 49.4% (Hb <110 g/L PW, Hb <120 g/L NPW).

Line note 21 Prevalence of anaemia 26.8% (Hb <110 g/L PW, Hb <120 g/L NPW).

Line note 22 Unweighted number of children.

Line note 23 Unweighted number of children.

Line note 24 Unweighted number of children.

Line note 25 Unweighted number of children.

Line note 26 Unweighted number of children.

Line note 27 Unweighted number of children.

Line note 28 Unweighted number of children.

Line note 29 Unweighted number of children.

Reference No: 2294

General Notes: *Five survey regions were defined: Almaty City, South Region (Taldy-Korganskaya, Almatinskaya, Dzhambylskaya, South Kazakstanskaya, Kzyl-Ordinskaya), West Region (Aktiubinskaya, Mangistauskaya, Atyrauskaya, West Kazakstanskaya), Central Region (Semipalatinskaya, Zhezkazganskaya, Turgaiskaya), North and East Region (East Kazakstanskaya, Pavlodarskaya, Karagandinskaya, Akmolinskaya, Kokchetauskaya, North Kazakstanskaya, Koustanaiskaya); sampling: in Almaty City two-stage sampling (1. counties; 2. households), in rural and urban areas three-stage sampling, in each selected households women aged 15-49 yrs were eligible; women are mothers of the children; sample not national representative for children.*

Line note 30 Prevalence of anaemia 48.8% (Hb <110 g/L PW, Hb <120 g/L NPW); disaggregated data by education, ethnicity.

Line note 31 Disaggregated data by ethnicity, education of mother, birth order, birth interval.

Line note 32 Prevalence of anaemia 45.6% (Hb <110 g/L PW, Hb <120 g/L NPW).

Line note 33 Prevalence of anaemia 51.0% (Hb <110 g/L PW, Hb <120 g/L NPW).

Line note 34 Prevalence of anaemia 47.2% (Hb <110 g/L PW, Hb <120 g/L NPW).

Line note 35 Prevalence of anaemia 53.3% (Hb <110 g/L PW, Hb <120 g/L NPW).

Line note 36 Prevalence of anaemia 51.1% (Hb <110 g/L PW, Hb <120 g/L NPW).

Line note 37 Prevalence of anaemia 44.9% (Hb <110 g/L PW, Hb <120 g/L NPW).

Line note 38 Prevalence of anaemia 48.8% (Hb <110 g/L PW, Hb <120 g/L NPW).

Line note 39 Prevalence of anaemia 46.2% (Hb <110 g/L PW, Hb <120 g/L NPW).

Line note 40 Prevalence of anaemia 52.1% (Hb <110 g/L PW, Hb <120 g/L NPW).

Line note 41 Prevalence of anaemia 38.2% (Hb <110 g/L PW, Hb <120 g/L NPW).

Line note 42 Prevalence of anaemia 50.3% (Hb <110 g/L PW, Hb <120 g/L NPW).

Line note 43 Prevalence of anaemia 58.9% (Hb <110 g/L PW, Hb <120 g/L NPW).

Line note 44 Prevalence of anaemia 43.8% (Hb <110 g/L PW, Hb <120 g/L NPW).

Line note 45 Prevalence of anaemia 47.4% (Hb <110 g/L PW, Hb <120 g/L NPW).

Reference No: 154

General Notes: *Facility based study (health centers) in three districts (Kazalinsk, Djalagash and Zhanakorgan) of the Kzyl-Orda Region; same study as reference No. 40; sampling: a two-stage sampling process was used, first 20-25 health centres were selected in each district from the full list of health centres based on a probability proportional to size, in the second stage women were selected from a complete list of women registered at the selected health centres, sampling frame was assumed to be complete since all women were required to be registered at their local health centre; inclusion only in the analysis of adult Kazakh women who were between 18 and 45 yrs of age and with complete set of data (n=3625 out of n=4238); exclusion of women who were pregnant or who had given birth within the preceding 6 months.*

Line note 46 Only mean Hb values.

Line note 47 Only mean Hb values.

Line note 48 Only mean Hb values.

Line note 49 Only mean Hb values.

Line note 50 Only mean Hb values.

Line note 51 Only mean Hb values.

Line note 52 Only mean Hb values.

Line note 53 Only mean Hb values.

Line note 54 Only mean Hb values.

Line note 55 Only mean Hb values.

Line note 56 Only mean Hb values.

Line note 57 Only mean Hb values.

Line note 58 Only mean Hb values.

Line note 59 Only mean Hb values.
Line note 60 Only mean Hb values.
Line note 61 Only mean Hb values.
Line note 62 Only mean Hb values.
Line note 63 Only mean Hb values.

Reference No: 40

General Notes: *Facility based study (health centers) in three districts (Kazalinsk, Djalagash and Zhanakorgan) of the Kzyl-Orda Region; same study as reference No. 154; sampling: a two-stage sampling process was used to select a random sample of women aged 15-45 yrs, selected women were encouraged to bring all of their children between 6 and 59 months of age; inclusion only of singleton Kazakh children in the analysis with complete set of data (n=2024 out of n=2492); exclusion of women who were pregnant or who had given birth within the preceding 6 months; sample of children not representative.*

Line note 64 Only mean Hb values.
Line note 65 Only mean Hb values.

Line note 66 Only mean Hb values.
Line note 67 Only mean Hb values.
Line note 68 Only mean Hb values.
Line note 69 Only mean Hb values.
Line note 70 Only mean Hb values.
Line note 71 Only mean Hb values.
Line note 72 Only mean Hb values.
Line note 73 Only mean Hb values.
Line note 74 Only mean Hb values.
Line note 75 Only mean Hb values.
Line note 76 Only mean Hb values.
Line note 77 Only mean Hb values.
Line note 78 Only mean Hb values.
Line note 79 Only mean Hb values.
Line note 80 Only mean Hb values.
Line note 81 Only mean Hb values.
Line note 82 Only mean Hb values.
Line note 83 Only mean Hb values.

REFERENCES

KAZAKHSTAN

- Reference 40** Dangour AD, Hill HL, Ismail SJ. Height, weight and haemoglobin status of 6 to 59-month-old Kazakh children living in Kzyl-Orda region, Kazakhstan. *European Journal of Clinical Nutrition*, 2002, 56 :1030-1038.
- Reference 154** Dangour AD, Hill HL, Ismail SJ. Haemoglobin status of adult non-pregnant Kazakh women living in Kzyl-Orda region, Kazakhstan. *European Journal of Clinical Nutrition*, 2001, 55 :1068-1075.
- Reference 1492** Hashizume M, Kunii O, Sasaki S, Shimoda T, Wakai S, Mazhitova Z, Dauletbaev D, Caypil W, Aldiyarova M, Farmer A, Yamashiro Y, Chiba M. Anemia and iron deficiency among schoolchildren in the Aral Sea region, Kazakhstan. *Journal of Tropical Pediatrics*, 2003, 49 :172-177.
- Reference 2294** National Institute of Nutrition [Kazakhstan], Academy of Preventive Medicine [Kazakhstan], Macro International Inc. Kazakhstan Demographic and Health Survey, 1995. Calverton, MD, National Institute of Nutrition/Macro International Inc, 1996.
- Reference 2675** Academy of Preventive Medicine [Kazakhstan], Macro International Inc. Kazakhstan Demographic and Health Survey, 1999. Calverton, MD, Academy of Preventive Medicine, Macro International Inc, 2000.

ADDITIONAL REFERENCES

KAZAKHSTAN

- Reference 4304 Hashizume M, Shimoda T, Sasaki S, Kunii O, Caypil W, Dauletbaev D, Chiba M. Anaemia in relation to low bioavailability of dietary iron among school-aged children in the Aral Sea region, Kazakhstan. *International Journal of Food Sciences and Nutrition*, 2004, 55 :37-43.
- Reference 5681 Hashizume M, Chiba M, Shinohara A, Iwabuchi S, Sasaki S, Shimoda T, Kunii O, Caypil W, Dauletbaev D, Alnazarova A. Anaemia, iron deficiency and vitamin A status among school-aged children in rural Kazakhstan. *Public Health Nutrition*, 2005, 8 :564-571.