

**VENEZUELA**
**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						
LU	2000 -2001	Maracaibo: Children	B	2.00- 7.07	202							114	9	C	2667	*	1
L	1999 P	Aroy, Marewa and Peraya: Children/Adults: Total	B	2.00- 70.99	399							110	29	A	3749	*	2
		Children/Adults by community: Aroy	B	2.00- 70.99	106							116	26				3
		Children/Adults by community: Marewa	B	2.00- 70.99	203							112	27				4
		Children/Adults by community: Peraya	B	2.00- 70.99	90												5
L	1998	Valencia: Pre-SAC	B	4.00- 6.99	196				13.0					D	4612	*	6
L	1997	Valencia: PW	F	13.00- 18.99	215			13.7				120	11	D	4668	*	7
L	1996	Valencia: PW	F	14.00- 48.99	630	0.6		34.4				119	14	C	3562	*	8
L	1994	Caracas: Children/Adolescents	B	7.00- 15.99	317									NS	939a	*	9
N	1992	Children/Adolescents: Total	B	7.00- 15.99	653									NS	939b	*	10
		Children/Adolescents by sex	F	11.00- 15.99	279					12.2							11
		Children/Adolescents by sex	M	11.00- 15.99	189												12
		Children/Adolescents by age	B	7.00- 7.99	185			9.7									13
		Children/Adolescents by age	B	11.00- 11.99	250												14
		Children/Adolescents by age	B	15.00- 15.99	218												15
		Children/Adolescents by sex and age	F	11.00- 11.99	141					12.8							16
		Children/Adolescents by sex and age	M	11.00- 11.99	109												17
		Children/Adolescents by sex and age	F	15.00- 15.99	138					11.6							18
		Children/Adolescents by sex and age	M	15.00- 15.99	80						8.8						19
		Children/Adolescents by region: Caracas	B	7.00- 15.99	282												20
N	1989 -1990	Children/Adolescents: Total	B	7.00- 15.99	1059									NS	939c	*	21
		Children/Adolescents by sex	F	11.00- 15.99	475					4.6							22
		Children/Adolescents by sex	M	11.00- 15.99	286												23
		Children/Adolescents by age	B	7.00- 7.99	298			5.0									24
		Children/Adolescents by age	B	11.00- 11.99	406												25
		Children/Adolescents by age	B	15.00- 15.99	355												26
		Children/Adolescents by sex and age	F	11.00- 11.99	245					3.3							27
		Children/Adolescents by sex and age	M	11.00- 11.99	161												28
		Children/Adolescents by sex and age	F	15.00- 15.99	230					6.1							29

VENEZUELA

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						
N	1989 -1990	Children/Adolescents by sex and age Children/Adolescents by region: Caracas	M	15.00- 15.99	125								NS	939c		30	
			B	7.00- 15.99	499												
N	1978 -1985	Pre-SAC SAC by age SAC by sex and age SAC by sex and age SAC by sex and age SAC by sex and age SAC by sex and age SAC by sex and age	B	1.00- 3.99	393			8.0				125	11	NS	1885	*	
			B	4.00- 7.99	652							131	9				32
			F	8.00- 10.99	301							135	10				33
			M	8.00- 10.99	257							134	10				34
			F	11.00- 13.99	400							137	9				35
			M	11.00- 13.99	404							140	11				36
			F	14.00- 16.99	447					6.0		138	10				
			M	14.00- 16.99	374							150	12				37
L	1972 P	Maracaibo: PW	F	15.00- 41.99	132			35.6					A	2762	*	38	

## NOTES

### VENEZUELA

---

**Reference No:** 2667

**General Notes:** *Facility based study (4 preschool institutions) in low socio-economic areas; dates of survey provided by investigator; sampling: design not explained; Hb cut-off level 5 yrs not according to WHO recommendations (please see 'Key to the data tables').*

**Line note 1** Prevalence of anaemia 38.1% (Hb <110 g/L <6 yrs, Hb 115 g/L 6-7 yrs); 104 girls+98 boys; mean (SD) age 61.1 (13.1) months; disaggregated data by age.

**Reference No:** 3749

**General Notes:** *Study among western Venezuelan Indians in three places (Aroy, Marewa, Peraya); sampling: design not explained; Hb cut-off levels children 1-5 yrs, 12-14 yrs and adults >=15 yrs not according to WHO recommendations (please see 'Key to the data tables').*

**Line note 2** Prevalence value calculated; prevalence of anaemia 62.4% (Hb <107 g/L both sexes 1-2 yrs, Hb <109 g/L both sexes 3-5 yrs, Hb <115 g/L both sexes 6-11 yrs, Hb <117 g/L females >=12 yrs, Hb <132 g/L males >=12 yrs); disaggregated data by sex, age.

**Line note 3** Prevalence of anaemia 71.7% (Hb <107 g/L both sexes 1-2 yrs, Hb <109 g/L both sexes 3-5 yrs, Hb <115 g/L both sexes 6-11 yrs, Hb <117 g/L females >=12 yrs, Hb <132 g/L males >=12 yrs); disaggregated data by sex, age.

**Line note 4** Prevalence of anaemia 52.2% (Hb <107 g/L both sexes 1-2 yrs, Hb <109 g/L both sexes 3-5 yrs, Hb <115 g/L both sexes 6-11 yrs, Hb <117 g/L females >=12 yrs, Hb <132 g/L males >=12 yrs); disaggregated data by sex, age.

**Line note 5** Prevalence of anaemia 74.4% (Hb <107 g/L both sexes 1-2 yrs, Hb <109 g/L both sexes 3-5 yrs, Hb <115 g/L both sexes 6-11 yrs, Hb <117 g/L females >=12 yrs, Hb <132 g/L males >=12 yrs); disaggregated data by sex, age.

**Reference No:** 4612

**General Notes:** *Sampling: design not explained; method: Microcell Sysmex Counter F-500; Hb cut-off levels children 4 yrs not according to WHO recommendations (please see 'Key to the data tables').*

**Line note 6** 110 boys+86 girls; mean (SD) age 5.1 (0.8) yrs.

**Reference No:** 4668

**General Notes:** *Facility based study (Maternidad del Sur "Dr. Armando Arcay"); method: semi-auto analyzer (Symex); sampling: design not explained; inclusion only of PW in their first trimester of pregnancy with no associated clinical problems and single pregnancy.*

**Line note 7** Prevalence of iron deficiency 18.4% (serum ferritin <12 µg/L); disaggregated data by age.

**Reference No:** 3562

**General Notes:** *Facility based study (Ciudad Hospitalaria "Dr Enrique Tejera"); sampling: 630 consecutive Venezuelan PW (low or very low income) in their 3rd trimester at labour were examined; exclusion of subjects with clinical infections, haemoglobinopathies, chronic inflammatory diseases.*

**Line note 8** Prevalence of iron deficiency anaemia 13.5% (Hb <110 g/L+serum ferritin <12 µg/L); median Hb: 115 g/L; 95% CI: 112 g/L, 115 g/L; mean (SD) age 24 (6.4) yrs.

**Reference No:** 939a

**General Notes:** *In this study, only children from labour and lower socioeconomic strata were analyzed; in 1993 the Venezuelan health authorities started an iron fortification program (maize and wheat flours); facility based study (392 public schools with a population of 2 900 000); sampling: 7-, 11- and 15-yr-old children (≈100 children for each age group) were selected at random; Hb cut-off levels 11yrs not according to WHO recommendations (please see 'Key to the data tables'); disaggregated data by sex, age.*

**Line note 9** Prevalence of anaemia 9.5% (Hb <115 g/L both sexes 7 yrs, Hb <120 g/L females 11 yrs, 15 yrs, Hb <125 g/L males 11 yrs, Hb <130 g/L males 15 yrs); prevalence of iron deficiency anaemia 4.7% (Hb cut-off levels+serum ferritin <12 µg/L).

**Reference No:** 939b

**General Notes:** *In this study, only children from labour and lower socioeconomic strata were analyzed, 38% and 42% of the Venezuelan population respectively; partly facility based study (schools, public health centers); sampling: 7-, 11- and 15-yr-old children (≈100 children for each age group) were selected at random from each region of the country (i.e., 80% of the regions); Hb cut-off levels 11 yrs not according to WHO recommendations (please see 'Key to the data tables').*

- Line note 10** Prevalence of anaemia 12.9% (Hb <115 g/L both sexes 7 yrs, Hb <120 g/L females 11 yrs, 15 yrs, Hb <125 g/L males 11 yrs, Hb <130 g/L males 15 yrs); prevalence of iron deficiency anaemia 5.5% (Hb cut-off levels+serum ferritin <12 µg/L).
- Line note 11** Prevalence of iron deficiency anaemia 7.2% (Hb <120 g/L+serum ferritin <12 µg/L).
- Line note 12** Prevalence of anaemia 16.9% (Hb <125 g/L 11 yrs, Hb <130 g/L 15 yrs); prevalence of iron deficiency anaemia 5.3% (Hb cut-off levels+serum ferritin <12 µg/L).
- Line note 13** Prevalence of iron deficiency anaemia 3.2% (Hb <115 g/L+serum ferritin <12 µg/L).
- Line note 14** Prevalence of anaemia 17.2% (Hb <120 g/L females, Hb <125 g/L males); prevalence of iron deficiency anaemia 6.8% (Hb cut-off levels+serum ferritin <12 µg/L).
- Line note 15** Prevalence of anaemia 10.6% (Hb <120 g/L females, Hb <130 g/L males); prevalence of iron deficiency anaemia 6.0% (Hb cut-off levels+serum ferritin <12 µg/L).
- Line note 16** Prevalence of iron deficiency anaemia 6.4% (Hb <120 g/L+serum ferritin <12 µg/L).
- Line note 17** Prevalence of anaemia 22.9% (Hb <125 g/L); prevalence of iron deficiency anaemia 7.3% (Hb <125 g/L+serum ferritin <12 µg/L).
- Line note 18** Prevalence of iron deficiency anaemia 8.0% (Hb <120 g/L+serum ferritin <12 µg/L).
- Line note 19** Prevalence of iron deficiency anaemia 2.5% (Hb <130 g/L+serum ferritin <12 µg/L).
- Line note 20** Prevalence of anaemia 18.1% (Hb <115 g/L both sexes 7 yrs, Hb <120 g/L females 11-, 15 yrs, Hb <125 g/L males 11 yrs, Hb <130 g/L males 15 yrs); prevalence of iron deficiency anaemia 6.0% (Hb cut-off levels+serum ferritin <12 µg/L); sample taken from 392 public schools with a population of 2.900 000; disaggregated data by sex, age.

**Reference No:** 939c

**General Notes:** *In this study, only children from labour and lower socioeconomic strata were analyzed, 38% and 42% of the Venezuelan population respectively; partly facility based study (schools, public health centers); sampling: 7-, 11- and 15-yr-old children (≈100 children for each age group) were selected at random from each region of the country (i.e., 80% of the regions); Hb cut-off levels 11 yrs not according to WHO recommendations (please see 'Key to the data tables').*

- Line note 21** Prevalence of anaemia 5.5% (Hb <115 g/L both sexes 7 yrs, Hb <120 g/L females 11 yrs, 15 yrs, Hb <125 g/L males 11 yrs, Hb <130 g/L males 15 yrs); prevalence of iron deficiency anaemia 2.1% (Hb cut-off levels+serum ferritin <12 µg/L).
- Line note 22** Prevalence of iron deficiency anaemia 2.3% (Hb <120 g/L+serum ferritin <12 µg/L).
- Line note 23** Prevalence of anaemia 7.3% (Hb <125 g/L 11 yrs, Hb <130 g/L 15 yrs); prevalence of iron deficiency anaemia 2.1% (Hb cut-off levels+serum ferritin <12 µg/L).
- Line note 24** Prevalence of iron deficiency anaemia 1.7% (Hb <115 g/L+serum ferritin <12 µg/L).
- Line note 25** Prevalence of anaemia 6.4% (Hb <120 g/L females, Hb <125 g/L males); prevalence of iron deficiency anaemia 2.7% (Hb cut-off levels+serum ferritin <12 µg/L).
- Line note 26** Prevalence of anaemia 4.8% (Hb <120 g/L females, Hb <130 g/L males); prevalence of iron deficiency anaemia 1.7% (Hb cut-off levels+serum ferritin <12 µg/L).
- Line note 27** Prevalence of iron deficiency anaemia 2.0% (Hb <120 g/L+serum ferritin <12 µg/L).
- Line note 28** Prevalence of anaemia 11.2% (Hb <125 g/L); prevalence of iron deficiency anaemia 3.7% (Hb <125 g/L+serum ferritin <12 µg/L).
- Line note 29** Prevalence of iron deficiency anaemia 2.6% (Hb <120 g/L+serum ferritin <12 µg/L).
- Line note 30** Prevalence of iron deficiency anaemia 0.0% (Hb <130 g/L+serum ferritin <12 µg/L).
- Line note 31** Prevalence of anaemia 4.0% (Hb <115 g/L both sexes 7 yrs, Hb <120 g/L females 11-, 15 yrs, Hb <125 g/L males 11 yrs, Hb <130 g/L males 15 yrs); prevalence of iron deficiency anaemia 1.4% (Hb cut-off levels+serum ferritin <12 µg/L); sample taken from 392 public schools with a population of 2.900 000; disaggregated data by sex, age.

**Reference No:** 1885

**General Notes:** *Part of national survey on growth, nutrition and the family that included all the socioeconomic strata of all regions of Venezuela; this paper reports on 3228 subjects aged 1-16 yrs and living in regions of Venezuela at altitudes between sea level and 900 m; sampling: design not explained; exclusion of PW and those showing an overt inflammation process; inclusion only of subjects in good health; Hb determination for subsample (of the 100.000 subjects, a representative 5% were selected); Hb cut-off levels both sexes 4 yrs, 11 yrs and males 12-14 yrs not according to WHO recommendations (please see 'Key to the data tables').*

- Line note 32** Prevalence of anaemia <4.0% (Hb <115 g/L).
- Line note 33** Prevalence of anaemia <4.0% (Hb <115 g/L).
- Line note 34** Prevalence of anaemia <4.0% (Hb <115 g/L).
- Line note 35** Prevalence of anaemia <4.0% (Hb <120 g/L).
- Line note 36** Prevalence of anaemia <4.0% (Hb <125 g/L).
- Line note 37** Prevalence of anaemia <4.0% (Hb <130 g/L).

**Reference No:** 2762

**General Notes:** *Facility based study (prenatal clinic) in western Region Maracaibo; sampling: design not explained; Hb determination at first visit.*

**Line note 38** Median Hb: 117 g/L; mean age 27 yrs; disaggregated data by gestational age.

## REFERENCES

### VENEZUELA

---

- Reference 939** Layrisse M, Cháves JF, Mendez-Castellano H, Bosch V, Tropper E, Bastardo B, González E. Early response to the effect of iron fortification in the Venezuelan population. *American Journal of Clinical Nutrition*, 1996, 64 :903-907.
- Reference 1885** Taylor PG, Martínez-Torres C, Méndez-Castellano H, Bosch V, Leets I, Tropper E, Layrisse M. The relationship between iron deficiency and anemia in Venezuelan children. *American Journal of Clinical Nutrition*, 1993, 58 :215-218.
- Reference 2667** Castejon HV, Ortega P, Amaya D, Gomez G, Leal J, Castejon OJ. Co-existence of anemia, vitamin A deficiency and growth retardation among children 24-84 months old in Maracaibo, Venezuela. *Nutritional Neuroscience*, 2004 7 :113-119.
- Reference 2762** Diez-Ewald M, Molina RA. Iron and folic acid deficiency during pregnancy in western Venezuela. *American Journal of Tropical Medicine and Hygiene*, 1972, 21 :587-591.
- Reference 3562** Marti-Carvajal A, Peña-Marti G, Comunian G, Muñoz S. Prevalence of anemia during pregnancy: results of Valencia (Venezuela) anemia during pregnancy study. *Archivos Latinoamericanos de Nutrición*, 2002, 52 :5-11.
- Reference 3749** Diez-Ewald M, Torres-Guerra E, Leets I, Layrisse M, Vizcaino G, Vizcaino MA. Anemia en poblaciones indígenas del occidente de Venezuela [Anemia among western Venezuelan indians]. *Investigación Clínica*, 1999, 40 :191-202.
- Reference 4612** del Real S, Páez MC, Solano L, Fajardo Z. Consumo de harina de maíz precocida y su aporte de hierro y vitamina A en preescolares de bajos recursos económicos [Corn flour intake and its contribution of iron and vitamin A in low income preschoolers]. *Archivos Latinoamericanos de Nutrición*, 2002, 52 :274-281.
- Reference 4668** Peña E, Sánchez A, Solano L. Perfil de riesgo nutricional en la adolescente embarazada [Profile of nutritional risk in pregnant adolescents]. *Archivos Latinoamericanos de Nutrición*, 2003, 53 :141-149.

## ADDITIONAL REFERENCES

### VENEZUELA

---

- Reference 446 Instituto Nacional de Nutricion. Venezuela. Conferencia Internacional Sobre Nutrición; 1992 Dic; Roma, Italia [Venezuela. International Conference on Nutrition; 1992 Dec; Rome, Italy]. Roma, Organización de las Naciones Unidas para la Agricultura y la Alimentación, 1992.
- Reference 935 Fossi M, Méndez-Castellano H, Jaffé WG, Martínez-Torres C, Leets I, Taylor P, Layrisse M. Perfil hematológico y absorción del hierro de dietas que consume la población de estrato socioeconómico bajo de dos estados de Venezuela [Hematologic profile and iron absorption from diets consumed by the population of low socioeconomic strata of two Venezuelan states]. *Archivos Latinoamericanos de Nutrición*, 1987, 37 :23-35.
- Reference 1884 Mato SP. Anemia and malaria in a Yanomami Amerindian population from the southern Venezuelan Amazon. *American Journal of Tropical Medicine and Hygiene*, 1998, 59 :998-1001.
- Reference 2711 Vaccaro Catalanello J. Concentración de hierro sérico durante el embarazo [Concentration of serum iron during pregnancy]. Caracas, Universidad Central De Venezuela, Facultad de Medicina, 1997.
- Reference 2761 Molina RA, Diez-Ewald M, Fernandez G, Velazquez N. Nutritional anaemia during pregnancy: a comparative study of two socio-economic classes. *Journal of Obstetrics and Gynaecology of the British Commonwealth*, 1974, 81 :454-458.
- Reference 3170 Instituto Nacional de Nutrición. Componente enriquecimiento de las harinas de maíz precocidad y trigo resultados enero-septiembre de 2001. Caracas, Instituto Nacional de Nutrición, 2001.
- Reference 3721 Barón MA, Solano L, Peña E, Morón A. Estado de la nutrición de folato, vitamina B12 y hierro en adolescentes embarazadas [Folate, vitamin B12 and iron nutritional status in pregnant adolescents]. *Archivos Latinoamericanos de Nutrición*, 2003, 53 :150-156.
- Reference 4226 Peña E, Solano L, Portillo Z, Meertens de Rodriguez L. Estado nutricional de adultos mayores institucionalizados: Valencia, estado Carabobo, Venezuela [Nutritional status of institutionalized elderly: Valencia, State of Carabobo, Venezuela]. *Archivos Latinoamericanos de Nutrición*, 1998, 48 :104-111.
- Reference 4262 Angarita C, Machado D, Morales G, de Méndez GG, de Viloria FA, Silva T, Alarcón OM, Alarcón OM. Estado nutricional, antropométrico, bioquímico y clínico en preescolares de la comunidad rural de Canaguá, Estado Mérida [Nutritional status: anthropometric, biochemical and clinical evaluations in preeschoolers in the rural community of Canagua, Mérida State]. *Anales Venezolanos de Nutrición*, 2001, 14 :75-85.
- Reference 4310 Pabón Mendoza L, Gómez Castillo E, Madrid Dupuis A, Perez Marquez AM. Prevalencia de anemia por déficit de hierro en niños de 6 meses a 5 años de edad del municipio Arismendi del Estado Nueva Esparta: Venezuela 2001 [Prevalence of anemia due to the iron deficiency among children between 6 months and 5 years of age in the municipal area of Arismendi of the Nueva Esparta State: Venezuela 2001]. *Revista Española de Salud Pública*, 2002, 76 :249-250.
- Reference 4371 García-Casal MN. La deficiencia de hierro como problema de salud pública [Iron deficiency as a public health problem]. *Anales Venezolanos de Nutrición*, 2005, 18 :45-48.
- Reference 4372 Brunetto MR, Alarcón OM, Dávila E, Contreras Y, Galignani M, Rondón C, Burguera JL, Burguera M, Angarita C. Serum trace elements and fat-soluble vitamins A and E in healthy pre-school children from a Venezuelan rural community. *Journal of Trace Elements in Medicine and Biology*, 1999, 13 :40-50.
- Reference 4491 Diez-Ewald M. Anemia nutricional del embarazo en el estado Zulia: treinta años después [Nutritional anemia of pregnancy in the Zulia state: 30 years later]. *Investigación Clínica*, 2002, 43 :229-230.
- Reference 4517 Garcia-Casal MN, Layrisse M. Iron fortification of flours in Venezuela. *Nutrition Reviews*, 2002, 60 (7 Pt 2):S26-S29.
- Reference 4638 Instituto Nacional de Nutricion, Fundación Cavendes. Perfil nutricional de Venezuela. *Anales Venezolanos de Nutrición*, 1999, 12 :55-72.

## ADDITIONAL REFERENCES

### VENEZUELA

---

- Reference 4666 Alarcón OM, Reinos Fuller J, Silva TM, Angarita C, Terán E, Navas M, Solano P, Agostinelli M. Serum level of Zn, Cu and Fe in healthy schoolchildren residing in Mérida, Venezuela. *Archivos Latinoamericanos de Nutrición*, 1997, 47 :118-122.
- Reference 4885 Macías-Tomey C, Landaeta-Jiménez M, Nieves García M, Hevia P, Layrisse M, Méndez Castellano H. Crecimiento físico y estado nutricional antropométrico de hierro y vitamina A en escolares de Venezuela [Physical growth and nutritional anthropometric iron and vitamine A status in Venezuelan schoolage children]. *Archivos Venezolanos de Puericultura y Pediatría*, 1999. 62
- Reference 5125 Layrisse M. Pasado, presente y futuro de la deficiencia de hierro en Venezuela [Past, present and future of iron deficiency in Venezuela]. *Anales Venezolanos de Nutrición*, 1994, 7 :43-44.
- Reference 5180 Portillo-Castillo ZC, Solano L, Fajardo Z. Riesgo de deficiencia de macro micronutrientes en preescolares de una zona marginal. Valencia, Venezuela [Risk of macro and micronutrients deficiency in low income preschool children. Valencia, Venezuela]. *Investigación Clínica*, 2004, 45 :17-28.
- Reference 5339 Suárez T, Torrealba M, Villegas N, Osorio C, García-Casal MN. Deficiencias de hierro, ácido fólico y vitamina B12 en relación a anemia, en adolescentes de una zona con alta incidencia de malformaciones congénitas en Venezuela. *Archivos Latinoamericanos de Nutrición*, 2005, 55 :118-123.
- Reference 5340 García-Casal MN. La deficiencia de hierro como problema de Salud Pública. *Anales Venezolanos de Nutrición*, 2005, 18 :45-48.