Reference Predicted Normal Values used in ndd Lung Function Products

This document describes in detail which predicted normal values are implemented in the current version of EasyOne and the PC software EasyWare and EasyWare Pro. The following tables show implementation details and the publications on which the reference values are based.

The tables have the following entries:

Reference:	Name of predicted normal reference used in EasyOne or the software. The name is the study name, or the name of the authors of the publication.
Year of Publication:	Year when the study was published.
Abbreviation:	Abbreviation for the study. The abbreviation is used if parameters from other studies are copied. Example: For most studies 'Cherniak' (CH) values are used for the MVV parameter.
Age Range:	Age range of the study. If range was extended beyond the study range the extended range is shown in parenthesis.
Height Range:	Height range of the study. Extended range also listed in parenthesis, as in age range.
Weight Range:	Weight range of the study. In most studies weight is not used.
EasyOne Availability:	The following codes are used:

Vx	the predicted source is available in main firmware version x. V2,5,6 stands for version 2.x, version 5.x and version 6.x
R	the predicted source is a reloadable resource; it may be loaded into the device

Ethnic:	Ethnic group that is supported by the study.
Parameter:	In the parameter list the following indicators are used:

O	the parameter is available in the study
O (green)	the parameter is available in the study and it is used in EasyOne
FVC, IVC	the value of the parameter is copied from listed parameter of the same source
FEV1/FVC	FEV1/FVC% is computed from the predicted of FEV1 and FVC of the same source

Lower Limit of Normal of Parameter: This table lists which lower limits of normal (LLN) are provided by the study. If the study does not have a formula for LLN, the LLN is set to 80% of the predicted for normal parameters (FVC, FEV1 etc.) and 90% of predicted for relative parameters like FEV1/FVC%.

Additional remarks:

Lung Age:	Lung Age is computed according to the following publication: Spirometric "Lung Age" Estimation for Motivating Smoking Cessation. J.F. Morris, W. Temple. Prev Med 14, 655-662 (1985).
LLN:	Lower limit of normal values; if not available as an equation, then the values are computed using the following formula: LLN = Predicted - 1.645 * SEE (Standard Error of Estimate).
Scand. References:	These predicted normal values are always combined with the Zapletal references for children.
Software:	This document describes the predicted values used in the following versions of ndd products:

Predicted Library	V1.12.02
EasyOne	Firmware Version V2.23.00.00, V5.08.00.00, V6.05.00.00 EasyWare Version V2.23
Easy on-PC	EasyWare Pro V1.3.4.2
EasyOne Pro	EasyWare Pro V1.3.4.3

	Predicted Normals for Spirometry							Ethnicity					Predicted Value ofParameter																							Lower Limit of Normal (LLN) of Parameter																			
	Reference	Year of Publication	Abbreviation	Age Range [yr]	Height Range [cm]	Weight Range [kg]	EasyOne Availability	Caucasian	African	Hispanic	Asian	Other	FVC	FIVC	VC	FEV1	FEV1/FVC%	FEV1/VC%	FEV0.5	FEV3	FEV6	FEV3/FVC%	FEV1/FEV6%	FEF25 (MEF75)	FEF50 (MEF50)	FEF75 (MEF25)	FEF25-75	PEF	PIF	MIF 50	MVV	Lung Age	FVC	FIVC	VC	FEV1	FEV1/FVC%	FEV1/IVC%	FEV0.5	FEV3	FEV6	FEV3/FVC%	FEV1/FEV6%	FEF25	FEF50	FEF75	FEF25-75	PEF	PIF	MIF 50	MVV
North America	**NHANES III**	1999	NH	8..80 (6..90)	110..195 (110..210)	unused	V2,5,6	o	o	o			o	FVC	FVC	o	o				o			o					o	o	CH	o	o	FVC	FVC	o	o				o			o	o			o	o			
	Knudson_83	1983 (1976)	KN83	6..85	107..183/196 (107..210)	unused	V2,5,6	o					o	FVC	FVC	o	o				o 76					o	o	o	o 76			CH	o	o	FVC	FVC	o	o			-				o	o	o	-			
	Knudson_76	1976	KN76	8..85	110..200 (110..210)	unused	V2,5,6	o					o	FVC	FVC	o	o				o							o	o			CH	o	o	FVC	FVC	o	o													
	Crapo	1981	CR	15..91	146..195 (146..210)	unused	V2,5,6	o					o	FVC	FVC	o	o				o		o					o				CH	o	o	FVC	FVC	o	o			o		o				o				
	Morris	1971 (1976)	MO	20..90	142..203 (142..210)	unused	V2,5,6	o					o	FVC	FVC	o	o 76											o				CH	o	o	FVC	FVC	o	o									o				
	Hsu	1979	HS	7..20 (4..20)	110..195 (93..210)	unused	V2,5,6	o	o	o			o	FVC	FVC	o	FEV1 /FVC											o	o			CH	o	o	FVC	FVC	o										o	o			
	Dockery (Harvard)	1993	DO	6..18	115..185 (115..210)	unused	V2,5,6	o	o				o	FVC	FVC	o	o											o				CH	o	o	FVC	FVC	o	o									o				
	Polgar	1971	PO	4..17	109..170 (90..210)	unused	V2,5,6	o					o	FVC	FVC	o	o				o							o	o			o		o	FVC	FVC	o	o													
	Gutierrez (Canada)	2004	CA	5..80 (5..90)	n/a	unused	V6	o					o	FVC	o	o	o								o	o	NH	NH	o	o	o	o	o	FVC	o	o	o							o	o	NH	NH	o	o	o
	Eigen	2001	EI	3..6	85..135	unused	V6	o					o	FVC	FVC	o	o										o	o					o	FVC	FVC	o	o									o	o			
Latin America	**Pereira**	1992	PE92	20..78 (20..)	136..182 (90..220)	unused	R	o	o				o	FVC	FVC	o	o										o	o					o	FVC	FVC	o	o									o	o			
	Pereira 2006, 2008	2006 2008	PE06	6..86	n/a	used	R	o					o	FVC	FVC	o	o								o	o	o	o			o		o	FVC	FVC	o	o							o	o	o	o			o
	Chile 2010, 1997	2010 1997	CHI	5..94	100..190	unused	V6	o		o			o	FVC	FVC	o	o										o				o		o	FVC	FVC	o	o									o				o
Europe	**ERS (ECCS / EGKS)**	1993	ER	18..70 (18..90)	145..195 (145..210)	unused	V2,5,6	o					o	FVC	IVC	o	o								o	o	o	o	o			CH	o	o	FVC	IVC	o	o						o	o	o	o	o			
	Zapletal	1977	ZA	6..17 (4..17)	115..180 (93..210)	unused	V2,5,6	o					o	FVC	o	o	o								o	o	o	o	o			CH		o	FVC	o	o	o						o	o	o	o	o			
	Stanojevic 2009	2009	ST	3..80	n/a	unused	V6	o					o	FVC	FVC	o	o											o						o	FVC	FVC	o	o									o				
	Rosenthal	1993	RO	4..19	110-185	unused	V6	o					o	FVC	o	o	o								o	o		o	o			CH		o	FVC	o	o	o							o	o		o	o			
	Austria 1988	1988	FO88	7..76 (7..90)	110..200 (110..210)	unused	V5,6	o					o	FVC	FVC	o	o								ER	ER	ER	ER	ER			o		o	FVC	FVC	o	o						ER	ER	ER	ER	ER			o
	Austria 1994	1994	FO94	5..90	109..200	used	R	o					o	FVC	FVC	o	o								o	o	o		o					o	FVC	FVC	o	o							o	o	o		o			
	Sapaldia (Swiss)	1996	SA	18..60 (18..90)	n/a	unused	R	o					o	FVC	FVC	o	o								o	o	o	o	o					o	FVC	FVC	o	o							o	o	o	o	o			
	Roca (Spain)	1982	BA	6..70	110-200 (110..210)	> 0	V2,5,6	o					o	FVC	FVC	o	FEV1 /FVC									o	o	o	o			CH		o	FVC	FVC	o									o	o	o	o			
	Vilozni 2005	2005	VI	2..7	85..130	unused	n/a	o					o	FVC	FVC	o	o		o							o	o	o	o					o	FVC	FVC	o	o		o						o		o	o			
Europe Scandinavia	**Hedenström (Sweden)**	1985 1986	HE	20..70 (18..90)	150..195 (150..210)	female: 45..94	V6	o					o	FVC	o	o	FEV1 /VC	o							o	o	o		o			o	o	o	FVC	o	o	FEV1 /VC	o					o	o	o		o				o
	Gulsvik (Norway)	1985	GU	20..70 (18..90)	150..190 (150..210)	unused	V5,6	o					o	VC	VC	o	o	o										o				CH	o	o	VC	VC	o	o	o								o				
	Berglund, Birath (Sweden)	1963	BE	20..70 (18..90)	154..191 (154..210)	unused	V5,6	o					o	VC	VC	o	o	o										o				o	o	o	VC	VC	o	o	o								o				o
	Langhammer (Norway)	2001	LA	20..80 (20..90)		unused	V5,6	o					o	FVC	FVC	o	o											o	o					o	FVC	FVC	o	o									o	o			
	Finnish	1982 1998	FI	6..90	115..180 (90..220)	unused	R	o					o	FVC	o	o	o									o	o		o					o	FVC	o	o	o								o			o			
	Nystad	2002	NO	3..7	85..130	used	n/a	o					o	FVC	o	o			o									o						o	FVC	o	o			o							o				
Australia	**Hibbert**	1989	HI	8..19 (6..19)	120..190 (90..220)	unused	R	o					VC	VC	o	o	FEV1 /FVC							o	o	o	o						VC	VC	o	o							o	o	o	o					
	Gore, Crockett	1995	GO	18..78 (18..)	145..195 (90..220)	unused	R	o					o	FVC	FVC	o	o											o	o					o	FVC	FVC	o	o									o	o			
Africa, Asia	**Ethiopia**	1985	ET	20..90	n/a	unused	V6		o				o	FVC	FVC	o	o												o					o	FVC	FVC	o											o			
	Asia 1, 2, 3, 4		A1-4	6..90	115..180 (90..220)	unused	R				o		VC	VC	o	o	o							(o)	o	o	o	o																							
	JRS 2001	2001	JR	18..92 (18..)	90..220	unused	R				o		o	FVC	o	o	o	o								o	o					o	FVC	o	o	o	o								o	o				
	Fukuda Standard	n/a	FU	5..100	n/a	unused	R				o		VC	VC	o	o	o							o	o	o	o	o																							

	Reference	Abbrev.	Publication
North America, Canada	NHANES III (Hankinson)	NH	JL Hankinson, JR Odencrantz, KB Fedan. Spirometric Reference Values from a Sample of the General U.S. Population. Am J Respir Crit Care Med, Vol 159, p 179-187, 1999.
	Knudson 1983	KN83	Knudson, Ronald J, Michael Lebowitz, Holberg Catherine J., Benjamin Burrows. Changes in the Normal Maximal Expiratory Flow-Volume Curve with Aging. American Review of Respiratory Disease, Volume 127, p. 725-734, 1983.
	Knudson 1976	KN76	Knudson, Ronald J, R Slatin, M Lebowitz, B Burrows. The maximal Expiratory Flow-Volume Curve. American Review of Respiratory Disease, Volume 113, p. 587-600, 1976.
	Crapo	CR	Crapo RO, Morris AH, Gardner RM. Reference spirometric values using techniques and equipment that meets ATS recommendations. Am Rev Respir Dis Volume 123, p.659-664, 1981.
	Morris	MO	Morris, James F., Koski, Arthur, Lavon Johnson. Spirometric Standards for Healthy Non-Smoking Adults. American Review of Respiratory Disease, Volume 10-3, p. 57-67, 1971 Morris, J.F. West J. Med (1976) 125:110-118.
	Hsu	HS	KH Hsu, PH Bartholomew, V Thompson, GSJ Hsieh. Ventilatory Functions of Normal children and Young Adults-Mexican-American, White, Black. I. Spirometry. J Pediatr Vol 95:14-23, 1979.
	Dockery, Wang (Harvard)	DO	X. Wang, D.W. Dockery, D. Wypij, M.E. Fay, B.G. Ferris. Pulmonary Function Between 6 and 18 Years of Age. Pediatr Pulmonol. 1993; 15:75-88.
	Polgar	PO	Polgar, Promadhat. Pulmonary Function Testing in Children: Techniques and Standards. W.B. Saunders Co., Philadelphia, 1971.
	Gutierrez (Canada)	CA	C. Gutierrez, RH Ghezzo, RT Abboud, et al. Reference values of pulmonary function tests for Canadian Caucasians. Can Respir J 2004; 11(6):414-424.
	Eigen	Ei	H Eigen, H Bieler, D Grant, K Christoph et al. Spirometric Pulmonary Function in Healthy Preschool Children. Am J Respir Crit Care Med Vol 163, 619-623, 2001.
	Cherniak	CH	RM Cherniak, MB Raber. Normal Standards for Ventilatory Function using an Automated Wedge Spirometer. American Review of Respiratory Disease. Vol 106, p.38-46, 1972.
Latin America	Pereira 1992	PE92	Carlos Alberto de Castro Pereira, Sueli da Penha Barreto, João Geraldo Simões, Francisco W.L. Pereira, José Gerson Gerstler, Joge Nakatani. Valores de referência para a espirometria em uma amostra da populacao brasileira adulta, Jornal de Pneumologia 18(1):10-22, maco de 1992.
	Pereira 2006, 2008	PE06	Pereira CAC et al. Espirometria em adultos 2006 and 2008. Remark: Spirometry predicted values 2006 and 2008 are identical.
	Chile 2010, 1997	CHI	Age › 18: MC Gutiérrez, GC Valdivia, LP Villarroel, GT Contreras et al. Nomogramas de ecuaciones de referencia espirométrica SER 2009. Rev Chil Enf Resir 2010; 26:9-15. Age ‹ 18: MC Gutiérrez, FC Rioseco, AO Rojas, DZ Casanova. Reference spirometric values for the Chilean population at sea level. Rev Med Chile 1996; 124:1295-1306.
Europe	ERS (ECCS, EGKS)	ER	P.H. Quanjer. Lung Volumes and Forced Ventilatory Flows. Eur Respir J, Vol 6, Suppl 16, p. 5-40, 1993.
	Zapletal	ZA	A. Zapletal, T. Paul, M. Samanek. Die Bedeutung heutiger Methoden der Lungenfunktionsdiagnostik zur Feststellung einer Obstruktion der Atemwege bei Kindern und Jugendlichen. Z. Erkrank. Atm.-Org., Volume 149, 343-371, 1977. A. Zapletal, M. Samanek, T. Paul. Upstream and total airway conductance in children and adolescents. Bull europ Physiopath resp 1982, 18, 31-37.
	Stanojevic 2009	ST	S. Stanojevic, A. Wade, TJ Cole, S Lum et al. Spirometry Centile Charts for Young Caucasian Children. Am J Respir Crit Care Med, Vol 180, pp 547-552, 2009. Web: www.lungfunction.org.
	Rosenthal	RO	M Rosenthal, SH Bain, D Cramer, P Helms, D Densison, A Bush, JO Warner. Lung function in white children aged 4 to 19 years: I – Spirometry. Thorax 1993; 48: 794-802.
	Austria 1988	FO88	G. Forche, K. Harnoncourt, E. Stadlober. Neue spirometrische Bezugswerte für Kinder, Jugendliche und Erwachsene. Öst. Ärzteztg. 43, 15-16, 1988.
	Austria 1994	FO94	G. Forche, H. Schinko. Skriptum Spirometrie der österreichischen Gesellschaft für Pneumologie. 1994.
	Sapaldia	SA	SAPALDIA team, O Brändli, CH. Schindler, N. Künzli, R. Keller, A.P. Perruchoud. Lung function in healthy never smoking adults: reference values and lower limits of normal of a Swiss population. Thorax 1996; 51:277-283.
	Spain (Roca)	BA	J. Roca et al. spirometric reference values for a Mediterranean population. Bull Eur Physiopathol Respir, 18:101-102, 1982.
	Vilozni 2005	VO	D Vilozni, A Barak, O Efrati, A Augarten, C Springer, Y Yahav, L Bentur. The role of computer games in measuring spirometry in healthy and 'asthmatic' preschool children. Chest 2005; 128: 1146-1155.
Scandinavia	Hedenström (Sweden)	HE	Female: H. Hedenström, P. Malmberg, K. Agarwal. Reference values for lung Function tests in females. Bull. Eur. Physiopathol. Respir. 21, p. 551-557, 1985. Male: H. Hedenström, P. Malmberg, H.V. Fridriksson. Reference values for lung function tests in men. Upsala J. Med. Sci., 91:299-310, 1986.
	Gulsvik (Norway)	GU	A. Gulsvik. Spirometri (Korrespondanser). Tidsskr Nor Loegeforen nr. 31, 105:2240-2, 1985.
	Berglund, Birath (Sweden)	BE	E. Berglund, G. Birath, J. Bjure, G. Grimby, I. Kjellmer, L. Sandqvist, B. Söderholm. Spirometric Studies in Normal Subjects. Acta Medica Scandinavica, Vol. 173, fasc. 2, p. 185-192, 1963. FEF2575, MVV: G. Birath, I. Kjellmer, L. Sandqvist. Spirometric Studies in Normal Subjects. Acta Medica Scandinavica, Vol. 173, fasc. 2, p. 193-198, 1963.
	Langhammer (Norway)	LA	A. Langhammer, R. Johnson, A. Gulsvik, T.L. Holmen, L. Bjermer. Forced spirometry reference values for Norwegian adults. Eur Respir J 2001; 18:770-779.
	Finnish	FI	Adult: The Scandinavian Journal of Clinical & Laboratory Investigation, Vol. 42 - Suppl 159, 1982. Pediatric: Suomen Lääkärilethi, Vol. 53, 395-402, 1998.
	Nystad	NY	W Nystad, SO Samuelson, P Nafstad, E Edvardsen, T Stensrud, JJK Joakkola. Feasibility of measuring lung function in preschool children. Thorax 2002; 57: 1021-1027.
Africa, Asia, Australia	Hibbert	HI	Marienne E. Hibbert, M App SCI, Anna Lannigan, RN, Louis I. Landau, MD, Peter D. Phelan, MD. Lung Function Values From a Longitudinal Study of Healthy Children Adolescents, Pediatric Pulmonology 7:101-109 (1989).
	Gore, Crockett	GO	CJ Gore, AJ Crockett, DG Pederson, ML Booth, A Bauman, N Owen. Spirometric standards for healthy adult lifetime nonsmokers in Australia. Eur Respir J, 1995, 8, 773-782.
	Ethiopia	ET	Y.A. Mengesha Y. Mekonnen. Spirometric lung function tests in normal non-smoking Ethiopian men and women. Thorax 1985; 40:465-468.
	Asia 1,2,3,4	A1-4	n/a
	JRS2001	JR	日本人のスパイログラムと動脈血液ガス分圧基準値 日本呼吸器学会肺生理専門委員会２００１年４月
	Fukuda Standard	FU	Mixed references from: Ishida, Kanagami, Baldwin, Bjure, Berglund, Dickman, Schmidt, Cherrniak, Needham.

	Predicted Normals for Lung Volumes and Diffusion Capacity						Ethnicity					Predicted of Parameter									LLN of Parameter								
	Reference	Year of Publication	Abbreviation	Age Range [yr]	Height Range [cm]	Weight Range [kg]	Caucasian	African	Hispanic	Asian	Other	DLCO	DL adj.	DLCO/VA	VA	TLC sb	RV sb	RV/TLC sb	FRC	IC	DLCO	DL adj.	DLCO/VA	VA	TLC sb	RV sb	RV/TLC sb	FRC	IC
North America	**Ayers** (see 1)	1975	Ay	5..76 (5..90)		unused	o					o		o	GB	GB	GB	GB			o			GB	GB	GB	GB		
	Burrows (see 1)	1961	Bu	20..90			o					o		o^4	GB	GB	GB	GB			o			GB	GB	GB	GB		
	Crapo	1981	Cr	16..91	146..194	unused	o					o		o	GB	GB	GB	GB			o		o	GB	GB	GB	GB		
	Goldman & Becklake (see 2)		GB	›19		unused	o								o	o	o	o						o	o	o	o		
	Knudson	1987	Kn	9..90		unused	o					o		o	o	o^4	GB	GB			o		o	o	o^4	GB	GB		
	McGrath & Thompson	1959	MT	15...75			o					o		o	GB	GB	GB	GB			o		o	GB	GB	GB	GB		
	Miller	1980	Mi	20..70 (20..80)		unused	o					o		o^4	o^4	o	GB	GB			o		o^4	o^4	o	GB	GB		
	Gutierrez (Canada)	2004	CA	20..80		unused	o					o		o	o	o	o	o	o	o	o		o	o	o	o	o	o	o
	NHANES	1996	NH			unused	o	o				o		o^4	GB	GB	GB	GB			o			GB	GB	GB	GB		
	Polgar	1971	Po	5..19		unused	o					o		o^4	GB	GB	GB				o			GB	GB	GB			
Europe Scandinavia	**ERS**	1993	ER	18..70 (18..90)		unused	o					o		o^4	o^4	o	o	o	o		o			o^4	o	o	o	o	
	Zapletal	1977	Za	6..17		unused	o					o		o^4	o^4	o	o		o		o			o^4	o	o		o	
	Roca	1990 1998	Ro	17..70 (17..90)	n/a	used	o					o		o	o	o	o	o	o	o	o		o	o	o	o	o	o	o
	Hedenström	1985 1986	He	20..70 (18..90)	150..195 (150..210)	used	o					o		o^4	o^4	o	o	o	o		o			o^4	o	o	o	o	
	Gulsvik	1992	Gu	18..73 (18..90)		unused	o					o		o	o	o^4	ER	ER	ER		o		o	o	o^4	ER	ER	ER	
Other	**Pereira 2008**	2008	PE08	20..80		unused			o			o		o^4	o^4	o	o	RV / TLC	o	o	o									
	Thompson (see 3)	2008	Th	45..72	m: 157..195 f: 141-184	m: 55-109 f: 47-92	o					o		o	o	o^4	GB	GB			o		o	o	o^4	GB	GB		

Remarks regarding predicted normal values for Diffusion Capacity:

1. The article of B. Make et al. compares different predicted normals sources and come to the conclusion that *"the same subject may be classified as 'normal', 'abnormal' or 'very abnormal' depending on which equation is used"*. This specifically applies to the predicted sources of Burrows (very low predicted values) and Ayers (no age dependency).
2. Goldman and Becklake predicted values are only used for TLCsb, RVsb and RV/TLCsb.
3. Thompson et al. predicted values can only be used down to the age of 45 years (see official publication). In cooperation with the authors it was decided to combine the predicted values of Thompson with those of Miller for ages ‹45 years.
4. VA and/or DLCO/VA predicted values are computed based on TLCsb predicted values minus the anatomic dead space Vd (see also note in 'Transfer factor for carbon monoxide' by M. Horstman, F. Mertens, H. Stam).

	Reference	Abbrev.	Publication
North America	Ayers	Ay	Ayers LN, Ginsberg ML, Fein J, Wasserman K. Diffusing capacity and interpretation of diffusing defects. West J Med 1975; 123:255-264.
	Burrows	Bu	Burrows BJ, Kasik JE, Niden AH, Barclay WR. Clinical usefulness of the single-breath pulmonary diffusing capacity test. Am Rev Respir Dis 1961; 84:798-806.
	Cotes	Co	Cotes JE. Lung function, 4th ed. Oxford: Blackwell Scientific, 1979.
	Crapo	Cr	Crapo RO, Morris AH. Standardized single breath normal values for carbon monoxide diffusing capacity. Am Rev Respir Dis 1981; 123:185-189.
	Goldman & Becklake	GB	Goldman HI, Becklake MR. Respiratory function tests; normal values at median altitudes and the prediction of normal results. Am Rev Tuberc. 1959 Apr;79(4):457-67.
	Knudson	Kn	Knudson RJ, Kaltenbom WT, Knudson DE, Burrows B. The single-breath carbon monoxide diffusing capacity: Reference equations derived from a healthy nonsmoking population and effects of hematocrit. Am Rev Respir Dis 1987; 135: 805–811.
	McGrath & Thompson	MT	McGrath MW, Thompson ML. The effect of age, body size and lung volume change on alveolar-capillary permeability and diffusing capacity in man. J Physiol 1959; 146:572-582.
	Miller	Mi	Miller A, Thornton JC, Warshaw R, Anderson H, Teirstein AS, Selikoff IJ. Single breath diffusing capacity in a representative sample of the population of Michigan, a large industrial state. Am Rev Respir Dis 1983; 127:270-277.
	NHANES	NH	LM Neas, J Schwartz. The determinants of pulmonary diffusing capacity in a national sample of U.S. adults. Am J Respir Crit Care Med, 153(2), 1996, 656-664.
	Gutierrez (Canada)	CA	C. Gutierrez, RH Ghezzo, RT Abboud, et al. Reference values of pulmonary function tests for Canadian Caucasians. Can Respir J 2004; 11(6):414-424.
	Polgar	Po	Polgar, Promadhat. Pulmonary Function Testing in Children: Techniques and Standards. W.B. Saunders Co., Philadelphia, 1971.
Europe Scandinavia	ERS	ER	P.H. Quanjer. Lung Volumes and Forced Ventilatory Flows. Eur Respir J, Vol 6, Suppl 16, p. 5-40, 1993.
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