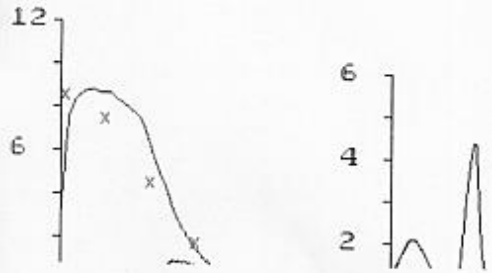
		oss.	teorici	%	lim.
VC	l	4.76	4.52	105	3.60-5.44
IVC	l	4.68	4.52	103	3.60-5.44
FVC	l	4.42	4.34	102	3.34-5.34
FEV1	l	3.69	3.44	107	2.60-4.28
FEV1/VC	%	77.45	76.83	101	65.0-88.6
FEV1/FVC	%	83.48			
RV	l	2.23	2.36	94	1.69-3.03
FRC	l	2.82	3.65	77	2.66-4.64
TLC	l	6.99	7.06	99	5.91-8.21
RV/TLC	%	31.86	36.21	88	27.2-45.2
FRC/TLC	%	40.32	56.00	72	44.9-67.1
PEF	l/s	8.83	8.54	103	6.5-10.5
MEF75	l/s	8.68	7.51	116	4.7-10.3
MEF50	l/s	6.45	4.57	141	2.40-6.74
MEF25	l/s	1.44	1.77	81	0.49-3.05
FIVC	l	3.94			
FIV1	l	3.90			
PIF	l/s	5.29			
MIF50	l/s	5.29			
FEV1/FIV1	%	94.62			
FEF25-75	l/s	4.30	3.65	118	1.94-5.36
MEF50/MIF50	%	121.91			

Teorici di Riferimento: Polgar 71 (6<eta'<18) ERS93 (18<=eta')

il Medico



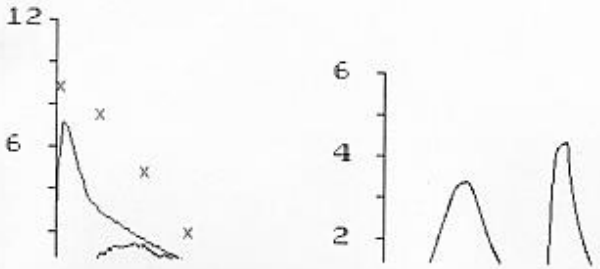
data: 08/11/2000

cartella n: 5578

		oss.	teorici	%	lim.	post-br	%/oss.
VC	l	4.58	4.50	102	3.58-5.42	4.72	103
IVC	l	4.58	4.50	102	3.58-5.42		
FVC	l	4.37	4.31	101	3.31-5.31	4.72	108
FEV1	l	2.63	3.62	73	2.78-4.46	3.01	114
FEV1/VC	%	57.45	80.59	71	68.8-92.4	63.82	111
FEV1/FVC	%	60.19				63.82	106
RV	l	1.48	1.77	84	1.10-2.44		
FRC	l	2.21	3.22	69	2.23-4.21		
TLC	l	6.06	6.27	97	5.12-7.42		
RV/TLC	%	24.44	28.08	87	19.1-37.1		
FRC/TLC	%	36.51	51.59	71	40.5-62.7		
PEF	l/s	7.23	8.83	82	6.8-10.8	8.31	115
MEF75	l/s	2.95	7.57	39	4.8-10.4	4.00	136
MEF50	l/s	1.74	4.84	36	2.67-7.01	2.33	134
MEF25	l/s	0.64	2.05	31	0.77-3.33	1.09	170
FIVC	l	4.04				4.06	101
FIV1	l	4.02				4.02	100
PIF	l/s	8.09				6.31	78
MIF50	l/s	7.89				5.84	74
FEV1/FIV1	%	65.37				74.95	115
FEF25-75	l/s	1.42	4.35	33	2.64-6.06	2.15	151
MEF50/MIF50	%	22.06				39.84	181

Teorici di Riferimento: Polgar 71 (6<eta'<18) ERS93 (18<=eta')

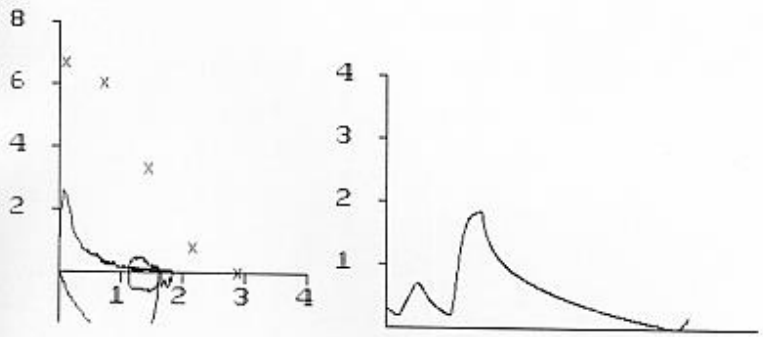
il Medico



		oss.	teorici	%	lim.	post-br	%/oss.
VC	l	2.24	2.99	75	2.07-3.91	1.91	85
ERV	l	0.72					
FVC	l	1.84	2.90	64	1.90-3.90	1.66	90
FEV1	l	0.78	2.17	36	1.33-3.01	0.75	97
FEV1/VC	%	34.68	73.25	47	61.4-85.0	39.37	114
FEV1/FVC	%	42.09				45.20	107
RV	l	1.67	2.59	64	1.92-3.26		
FRC	l	2.44	3.45	71	2.46-4.44		
TLC	l	3.90	5.79	67	4.64-6.94		
RV/TLC	%	42.72	43.95	97	34.9-52.9		
FRC/TLC	%	62.39	60.20	104	49.1-71.3		
PEF	l/s	2.63	6.70	39	4.71-8.69	2.27	86
MEF75	l/s	0.68	6.06	11	3.25-8.87	0.67	99
MEF50	l/s	0.27	3.34	8	1.17-5.51	0.27	100
MEF25	l/s	0.14	0.83	17	-0.45-2.11	0.08	58
FIVC	l	1.63				1.91	117
FIV1	l	1.56				1.80	115
PIF	l/s	2.35				2.54	108
MIF50	l/s	2.16				2.54	117
FEV1/FIV1	%	49.64				41.83	84
FEF25-75	l/s	0.22	2.47	9	0.76-4.18	0.21	97
MEF50/MIF50	%	12.50				10.65	85

Teorici di Riferimento: Polgar 71 (6<eta'<18) ERS93 (18<=eta')

il Medico



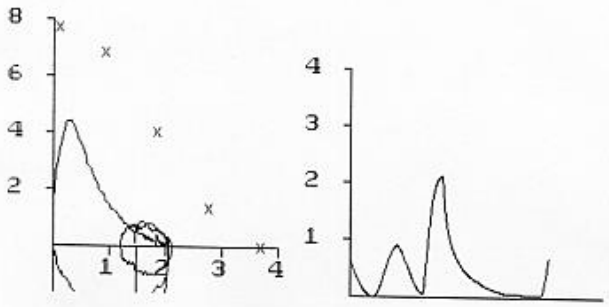
data: 24/11/2006

cartella n: 13277

		oss.	teorici	%	lim.	post-br	%/oss.
VC	l	2.47	3.84	64	2.92-4.76	2.08	84
IVC	l	2.40	3.84	63	2.92-4.76		
FVC	l	2.07	3.69	56	2.69-4.69	1.94	94
FEV1	l	1.54	2.89	53	2.05-3.73	1.36	88
FEV1/VC	%	62.37	75.57	83	63.8-87.4	65.18	105
FEV1/FVC	%	74.40				69.96	94
RV	l	3.14	2.41	130	1.74-3.08		
FRC	l	3.58	3.52	102	2.53-4.51		
TLC	l	5.61	6.43	87	5.28-7.58		
RV/TLC	%	55.95	38.92	144	29.9-47.9		
FRC/TLC	%	63.88	57.47	111	46.4-68.6		
PEF	l/s	4.45	7.75	57	5.76-9.74	4.69	105
MEF75	l/s	3.55	6.87	52	4.06-9.68	3.11	88
MEF50	l/s	1.41	4.04	35	1.87-6.21	1.00	71
MEF25	l/s	0.45	1.38	33	0.10-2.66	0.17	38
FIVC	l	2.17				2.08	96
FIV1	l	2.17				1.98	91
PIF	l/s	3.64				3.54	97
MIF50	l/s	3.58				2.45	68
FEV1/FIV1	%	70.94				68.46	97
FEF25-75	l/s	1.14	3.19	36	1.48-4.90	0.65	57
MEF50/MIF50	%	39.24				40.74	104

Teorici di Riferimento: Polgar 71 (6<eta'<18) ERS93 (18<=eta')

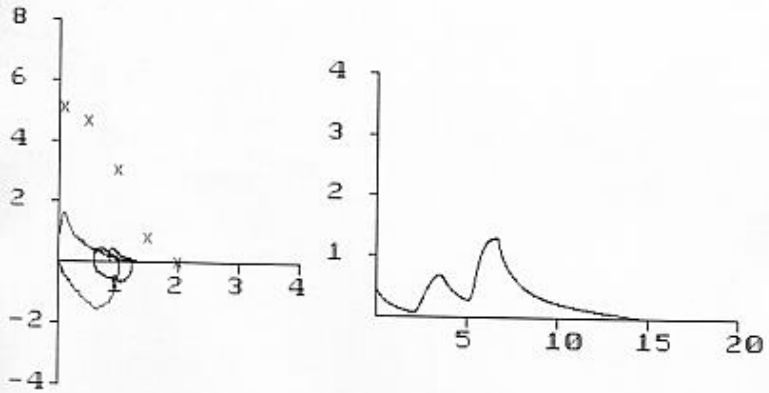
il Medico



		oss.	teorici	%	lim.	post-br	%/oss.
VC	l	1.33	1.97	68	1.28-2.66	1.25	94
IVC	l	1.33	2.12	63	1.43-2.81		
FVC	l	1.31	2.00	66	1.29-2.71	1.25	96
FEV1	l	0.69	1.62	42	1.00-2.24	0.71	103
FEV1/VC	%	51.85	74.51	70	63.8-85.2	56.60	109
FEV1/FVC	%	52.51				56.60	108
RV	l	2.42	2.02	120	1.44-2.60		
FRC	l	2.54	2.55	99	1.73-3.37		
TLC	l	3.75	4.44	84	3.45-5.43		
RV/TLC	%	64.50	44.42	145	34.8-54.0		
FRC/TLC	%	67.73	57.22	118	47.4-67.0		
PEF	l/s	1.62	5.14	31	3.66-6.62	1.81	112
MEF75	l/s	0.82	4.68	18	2.46-6.90	0.85	104
MEF50	l/s	0.36	3.05	12	1.24-4.86	0.36	100
MEF25	l/s	0.14	0.83	16	-0.30-1.96	0.08	56
FEF25-75	l/s	0.30	2.28	13	0.88-3.68	0.30	99

Teorici di Riferimento: Polgar 71 (6<eta'<18) ERS93 (18<=eta')

il Medico

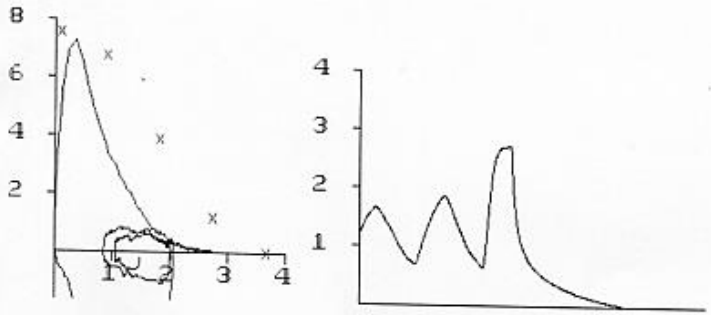


data: 27/11/2002 cartella n: 8266

		oss.	teorici	%	lim.	post-br	%/oss.
VC	l	3.01	3.80	79	2.88-4.72	2.91	96
IVC	l	2.94	3.80	77	2.88-4.72		
FVC	l	2.73	3.66	74	2.66-4.66	2.91	106
FEV1	l	1.97	2.77	71	1.93-3.61	1.98	101
FEV1/VC	%	65.39	73.79	89	62.0-85.6	68.19	104
FEV1/FVC	%	72.16				68.19	94
RV	l	1.84	2.68	68	2.01-3.35		
FRC	l	2.87	3.71	78	2.72-4.70		
TLC	l	4.85	6.75	72	5.60-7.90		
RV/TLC	%	37.89	42.78	89	33.8-51.8		
FRC/TLC	%	59.25	59.57	99	48.5-70.7		
PEF	l/s	7.28	7.56	96	5.57-9.55	7.44	102
MEF75	l/s	4.94	6.80	73	3.99-9.61	4.74	96
MEF50	l/s	1.88	3.89	48	1.72-6.06	1.74	92
MEF25	l/s	0.37	1.22	30	-0.06-2.50	0.54	147
FIVC	l					2.29	
FIV1	l					2.15	
PIF	l/s					3.15	
FEV1/FIV1	%					92.18	
FEF25-75	l/s	1.28	2.84	45	1.13-4.55	1.33	104

Teorici di Riferimento: Polgar 71 (6<eta'<18) ERS93 (18<=eta')

il Medico



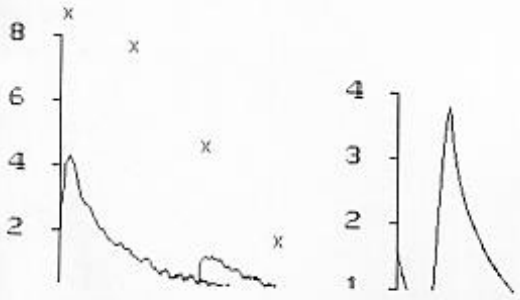
data: 13/12/2000

cartella n: 5720

		oss.	teorici	%	lim.	post-br	%/oss.
VC	l	4.99	4.78	104	3.86-5.70	4.56	91
IVC	l	4.99	4.78	104	3.86-5.70		
FVC	l	3.80	4.58	83	3.58-5.58	4.56	120
FEV1	l	1.65	3.57	46	2.73-4.41	1.79	109
FEV1/VC	%	32.98	75.75	44	64.0-87.6	39.26	119
FEV1/FVC	%	43.32				39.29	91
RV	l	4.16	2.59	161	1.92-3.26		
FRC	l	4.63	3.87	120	2.88-4.86		
TLC	l	9.15	7.62	120	6.47-8.77		
RV/TLC	%	45.43	38.53	118	29.5-47.5		
FRC/TLC	%	50.65	57.26	88	46.2-68.4		
PEF	l/s	4.31	8.71	50	6.7-10.7	4.49	104
MEF75	l/s	1.64	7.72	21	4.9-10.5	1.81	110
MEF50	l/s	0.73	4.64	16	2.47-6.81	0.86	118
MEF25	l/s	0.32	1.79	18	0.51-3.07	0.46	145
FIVC	l	3.40				4.56	134
FIV1	l	3.37				3.70	110
PIF	l/s	4.63				3.63	78
MIF50	l/s	4.40				3.63	83
FEV1/FIV1	%	48.80				48.37	99
FEF25-75	l/s	0.62	3.52	18	1.81-5.23	0.75	122
MEF50/MIF50	%	16.64				23.70	142

Teorici di Riferimento: Polgar 71 (6<eta'<18) ERS93 (18<=eta')

il Medico



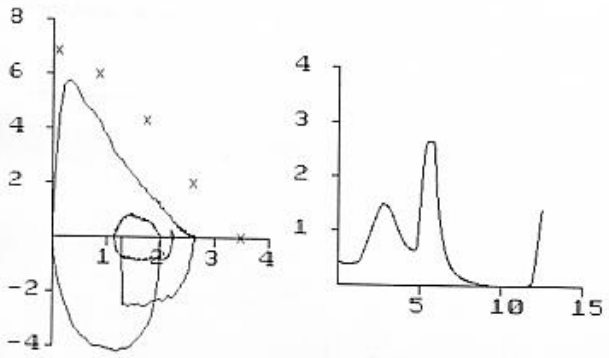
data: 19/04/2005

cartella n: 11275

		oss.	teorici	%	lim.	post-br	%/oss.
VC	l	2.86	3.47	83	2.78-4.16	2.87	100
IVC	l	2.86	3.53	81	2.84-4.22		
FVC	l	2.67	3.48	77	2.77-4.19	2.87	107
FEV1	l	2.28	3.02	75	2.40-3.64	2.47	108
FEV1/VC	%	79.73	83.15	96	72.4-93.8	86.17	108
FEV1/FVC	%	85.39				86.17	101
RV	l	0.96	1.43	67	0.85-2.01		
FRC	l	1.71	2.66	64	1.84-3.48		
TLC	l	3.82	4.90	78	3.91-5.89		
RV/TLC	%	25.12	29.34	86	19.7-38.9		
FRC/TLC	%	44.73	50.07	89	40.3-59.9		
PEF	l/s	5.80	6.88	84	5.40-8.36	5.88	101
MEF75	l/s	4.77	6.03	79	3.81-8.25	5.32	111
MEF50	l/s	2.85	4.35	66	2.54-6.16	3.71	130
MEF25	l/s	1.33	2.03	65	0.90-3.16	1.68	126
FEF25-75	l/s	2.48	3.90	64	2.50-5.30	3.17	128

Teorici di Riferimento: Polgar 71 (6<eta'<18) ERS93 (18<=eta')

il Medico



Nuove Cliniche III piano Via Rampari di S. Rocco 44100 Ferrara tel. 0532/

sesso: M d.n.: 02/10/19

g.e.: B alt.: 168 eta': 63

peso: 76.0 c.r.:

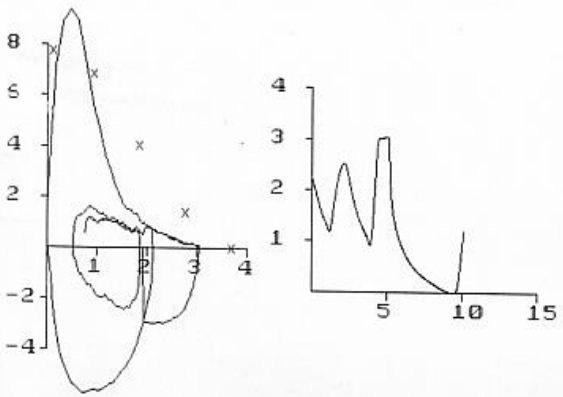
tel.: 051/975059

data: 26/11/2002 cartella n: 8257

		oss.	teorici	%	lim.	post-br	%/oss.
VC	l	3.07	3.84	80	2.92-4.76	3.03	99
FVC	l	3.05	3.69	83	2.69-4.69	3.03	99
FEV1	l	2.25	2.91	77	2.07-3.75	2.29	102
FEV1/VC	%	73.31	75.93	97	64.1-87.7	75.36	103
FEV1/FVC	%	73.70				75.36	102
RV	l	1.93	2.35	82	1.68-3.02		
FRC	l	3.04	3.48	87	2.49-4.47		
TLC	l	5.00	6.35	79	5.20-7.50		
RV/TLC	%	38.58	38.14	101	29.1-47.1		
FRC/TLC	%	60.76	57.05	106	46.0-68.2		
PEF	l/s	9.40	7.77	121	5.78-9.76	8.90	95
MEF75	l/s	7.48	6.87	109	4.06-9.68	7.59	101
MEF50	l/s	1.75	4.07	43	1.90-6.24	1.89	108
MEF25	l/s	0.63	1.40	45	0.12-2.68	0.63	100
FEF25-75	l/s	1.59	3.26	49	1.55-4.97	1.70	107

Teorici di Riferimento: Polgar 71 (6<eta'<18) ERS93 (18<=eta')

il Medico

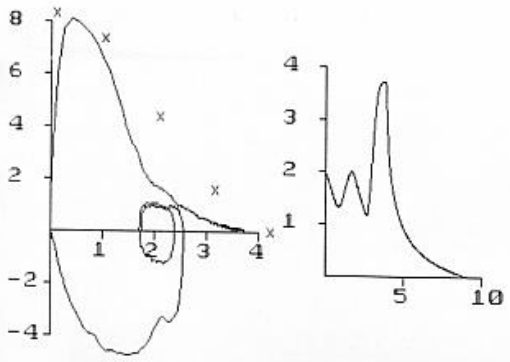


data: 09/12/2002 cartella n: 8303

		oss.	teorici	%	lim.
VC	l	3.83	4.42	87	3.50-5.34
IVC	l	3.74	4.42	85	3.50-5.34
FVC	l	3.74	4.24	88	3.24-5.24
FEV1	l	2.70	3.31	82	2.47-4.15
FEV1/VC	%	70.50	75.75	93	64.0-87.6
FEV1/FVC	%	72.19			
RV	l	3.38	2.51	135	1.84-3.18
FRC	l	4.34	3.73	116	2.74-4.72
TLC	l	7.21	7.14	101	5.99-8.29
RV/TLC	%	46.85	38.53	122	29.5-47.5
FRC/TLC	%	60.24	57.26	105	46.2-68.4
PEF	l/s	8.15	8.34	98	6.4-10.3
MEF75	l/s	7.01	7.39	95	4.6-10.2
MEF50	l/s	2.16	4.42	49	2.25-6.59
MEF25	l/s	0.63	1.64	39	0.36-2.92
FEF25-75	l/s	1.88	3.41	55	1.70-5.12

Teorici di Riferimento: Polgar 71 (6<eta'<18) ERS93 (18<=eta')

il Medico

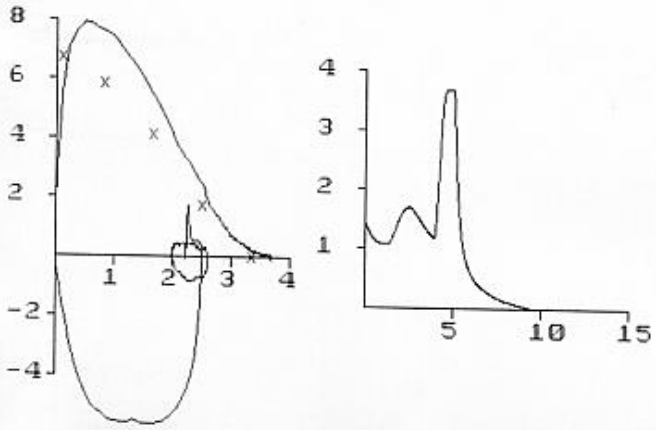


data: 25/11/2002 cartella n: 8253

		oss.	teorici	%	lim.
VC	l	3.80	3.36	113	2.67-4.05
IVC	l	3.80	3.45	110	2.76-4.14
FVC	l	3.70	3.35	110	2.64-4.06
FEV1	l	3.12	2.89	108	2.27-3.51
FEV1/VC	%	82.05	80.27	102	69.6-91.0
FEV1/FVC	%	84.26			
RV	l	1.36	1.78	77	1.20-2.36
FRC	l	2.36	2.81	84	1.99-3.63
TLC	l	5.16	5.30	97	4.31-6.29
RV/TLC	%	26.39	34.37	77	24.8-44.0
FRC/TLC	%	45.66	52.45	87	42.7-62.3
PEF	l/s	7.94	6.76	118	5.28-8.24
MEF75	l/s	7.58	5.85	130	3.63-8.07
MEF50	l/s	4.95	4.12	120	2.31-5.93
MEF25	l/s	1.40	1.72	81	0.59-2.85
FEF25-75	l/s	3.92	3.46	113	2.06-4.86

Teorici di Riferimento: Polgar 71 (6<eta'<18) ERS93 (18<=eta')

il Medico



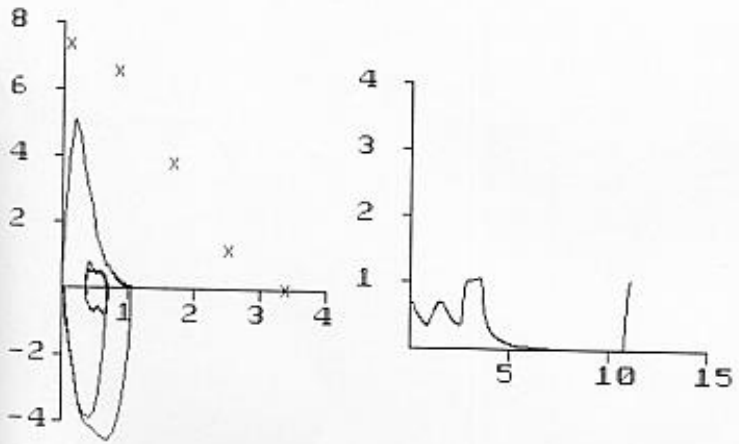
data: 12/02/2007

cartella n: 13548

		oss.	teorici	%	lim.	post-br	%/oss.
VC	l	1.06	3.51	30	2.59-4.43	1.00	94
ERV	l	0.29					
IVC	l	1.06	3.51	30	2.59-4.43		
FVC	l	1.06	3.39	31	2.39-4.39	1.00	94
FEV1	l	0.93	2.63	35	1.79-3.47	0.90	97
FEV1/VC	%	87.22	75.04	116	63.2-86.8	89.66	103
FEV1/FVC	%	87.22				89.66	103
RV	l	0.88	2.43	36	1.76-3.10		
FRC	l	1.20	3.45	35	2.46-4.44		
TLC	l	1.94	6.11	32	4.96-7.26		
RV/TLC	%	45.38	40.08	113	31.1-49.1		
FRC/TLC	%	61.77	58.10	106	47.0-69.2		
PEF	l/s	5.12	7.37	69	5.38-9.36	4.64	91
MEF75	l/s	4.61	6.57	70	3.76-9.38	3.79	82
MEF50	l/s	1.75	3.80	46	1.63-5.97	1.25	72
MEF25	l/s	0.45	1.19	38	-0.09-2.47	0.37	82
FEF25-75	l/s	1.27	2.98	43	1.27-4.69	1.10	87

Teorici di Riferimento: Polgar 71 (6<eta'<18) ERS93 (18<=eta')

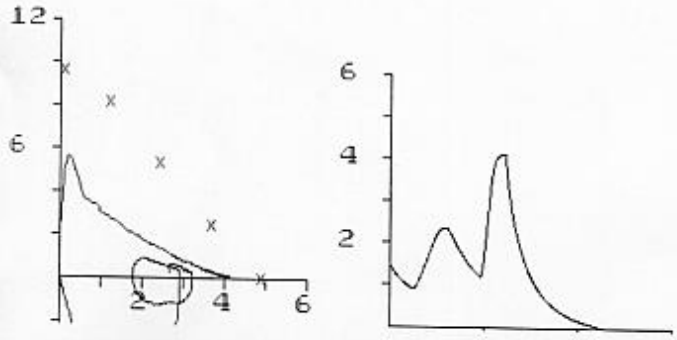
il Medico



		oss.	teorici	%	lim.	post-br	%/oss.
VC	l	4.58	5.14	89	4.22-6.06	5.03	110
IVC	l	4.48	5.14	87	4.22-6.06		
FVC	l	4.14	4.91	84	3.91-5.91	5.03	122
FEV1	l	2.54	4.18	61	3.34-5.02	3.66	144
FEV1/VC	%	55.42	82.74	67	70.9-94.5	72.83	131
FEV1/FVC	%	61.35				72.83	119
RV	l	2.50	1.57	159	0.90-2.24		
FRC	l	3.22	3.17	102	2.18-4.16		
TLC	l	7.09	6.67	106	5.52-7.82		
RV/TLC	%	35.33	23.43	151	14.4-32.4		
FRC/TLC	%	45.43	49.07	93	38.0-60.2		
PEF	l/s	5.68	9.65	59	7.7-11.6	7.38	130
MEF75	l/s	3.05	8.19	37	5.4-11.0	6.48	212
MEF50	l/s	1.76	5.40	33	3.23-7.57	4.01	228
MEF25	l/s	0.77	2.49	31	1.21-3.77	2.21	288
FIVC	l					4.03	
FIV1	l					4.03	
PIF	l/s					6.96	
FEV1/FIV1	%					90.97	
FEF25-75	l/s	1.57	4.97	32	3.26-6.68	3.84	245

Teorici di Riferimento: Polgar 71 (6<eta'<18) ERS93 (18<=eta')

il Medico



cod.: Amb. centro asma peso: 83.0 c.r.:

ind.: [redacted] tel.: [redacted]

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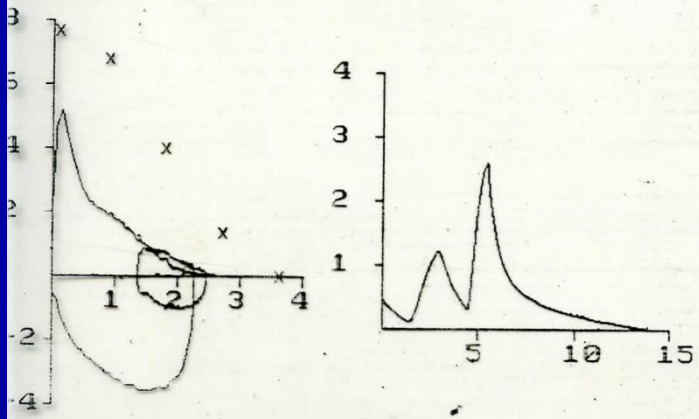
data: 18/01/2002 cartella n: 7135

VALORI SPIROMETRICI A RIPOSO E POST BRONCODILATATORE

		oss.	teorici	%	lim.	post-br	%/oss.
VC	l	2.76	3.77	73	2.85-4.69	3.05	110
IVC	l	2.76	3.77	73	2.85-4.69		
FVC	l	2.60	3.63	72	2.63-4.63	3.05	117
FEV1	l	1.72	2.86	60	2.02-3.70	2.11	123
FEV1/VC	%	62.27	75.93	82	64.1-87.7	69.27	111
PEF	l/s	5.23	7.71	68	5.72-9.70	6.63	127
MEF75	l/s	2.33	6.82	34	4.01-9.63	3.87	166
MEF50	l/s	1.34	4.03	33	1.86-6.20	2.19	163
MEF25	l/s	0.32	1.38	23	0.10-2.66	0.99	309
FIVC	l					2.74	
FIV1	l					2.74	
PIF	l/s					4.47	
FEV1/FIV1	%					77.03	

Teorici di riferimento: POLGAR 71 (6<eta'<18) CECA 83 (18<=eta'<80)

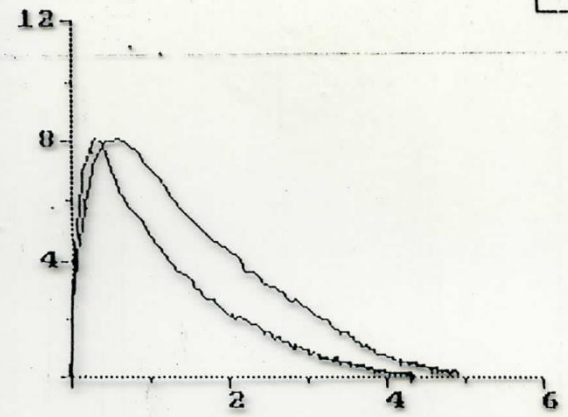
il Medico



25gen1999 14:37 20°C 777mmHg

MIGLIORE CURVA BASALE E POSTBRONCODILATATORE

n.2572 [redacted] M 27anni 176cm 95Kg



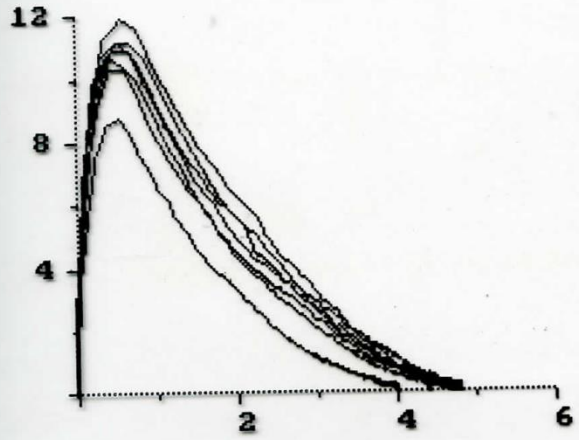
Criterio applicato: ATS94
Test in esecuzione
prove accettabili 2/2
riprod FVC 180 ml (3.7%)
riprod FEV1 180 ml (5.0%)

	FVC	FEV1	PEF	DtPEF	Vext	FET	Plat	C
obr	4.92	3.61	8.04	79	2.0%	4.9	0.2	B
pas	4.34	2.81	8.05	49	1.4%	7.5	0.6	B

Test di provocazione bronchiale con metacolina

06lug2000 11:55 27°C 771mmHg

M 39anni 178cm 91Kg



	Dose	FEV1	%	FVC	%
6-30	4.000	3.80	-5	4.69	-3
6-90	4.000	3.81	-5	4.75	-2
6-5'	4.000	3.57	-11	4.41	-9
7-30	8.000	3.11	-23	4.01	-17

PC- 10 FEV1
4.0000

PC- 20 FEV1
6.8380

PC- 10 FVC
4.4684

PC- 20 FVC

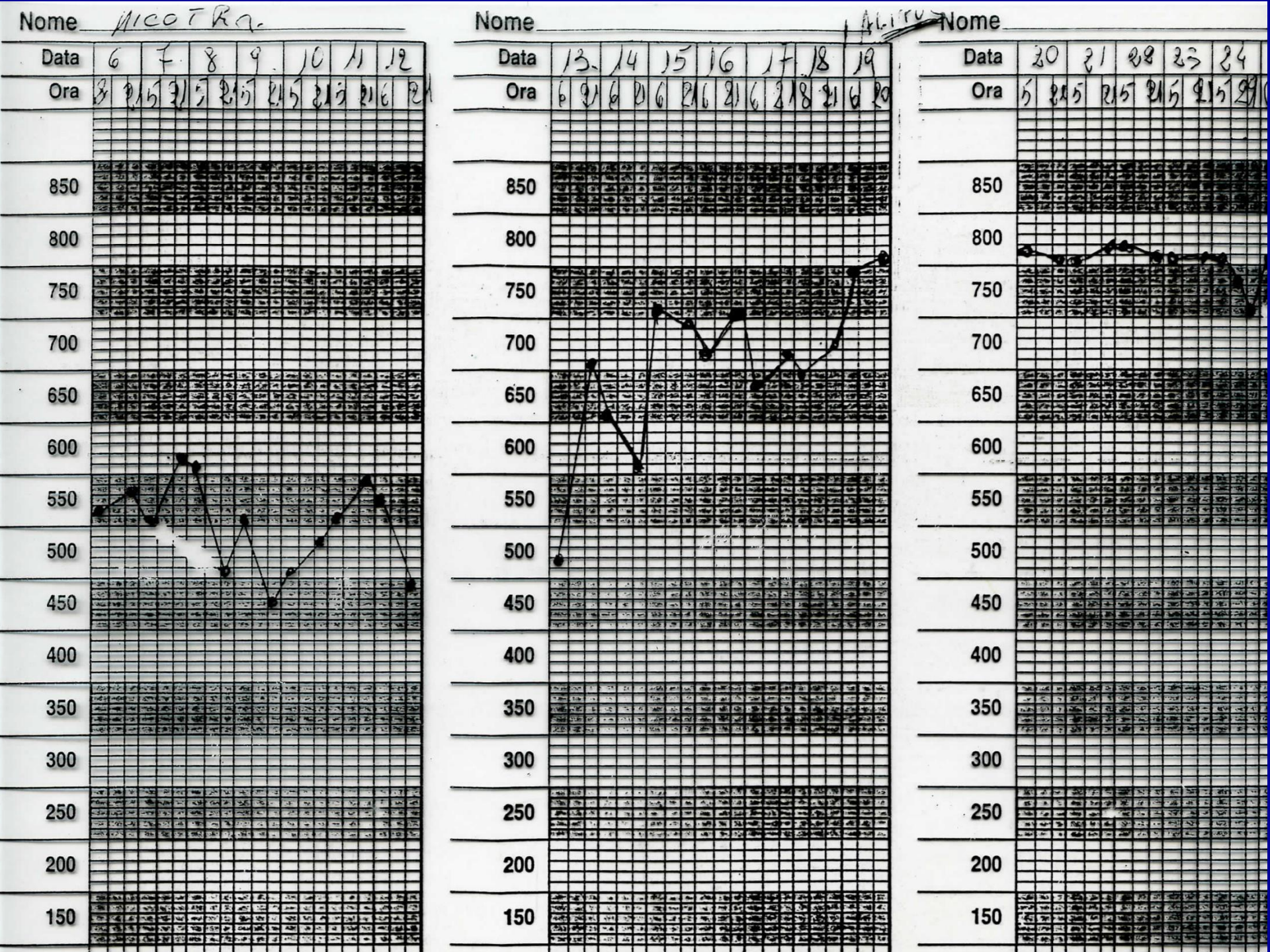
Nome MICOTRA

Nome ALITU

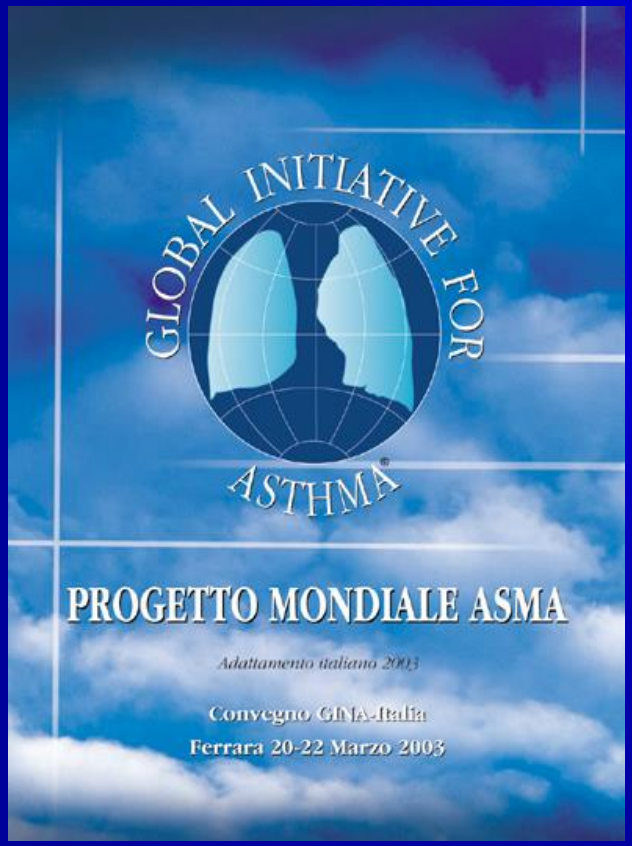
Nome

Data	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Ora	8	21 5	21 5	21 5	21 5	21 5	21 6	6	21	6	20	6	21 6	21 6	21 6	18	21	6	20	5	21 5	21 5	21 5	21 5	21 5	21

850
800
750
700
650
600
550
500
450
400
350
300
250
200
150



Rapporto del Gruppo di Lavoro del GINA



Argomenti:

- **Definizione**
- Epidemiologia ed impatto socio-economico dell'asma
- Fattori di rischio
- Patogenesi
- Diagnosi e Classificazione
- Educazione del paziente e somministrazione delle cure
- Programma di trattamento dell'asma in sei parti
- Raccomandazioni per la ricerca

Definition of asthma

Asthma is a heterogeneous disease, usually characterized by chronic airway inflammation.

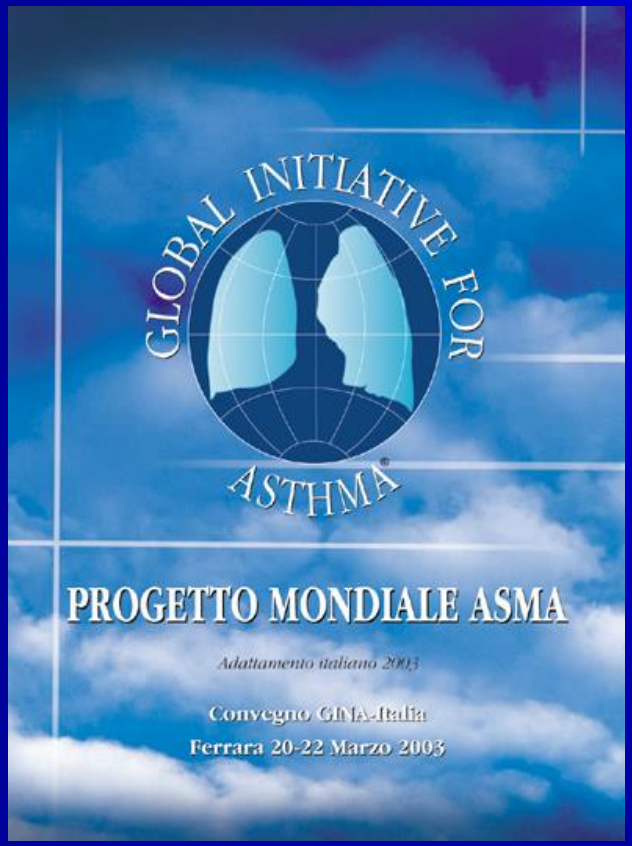
It is defined by the history of respiratory symptoms such as wheeze, shortness of breath, chest tightness and cough that vary over time and in intensity, together with variable expiratory airflow limitation.

Asma bronchiale: definizione

L'asma è una malattia infiammatoria cronica delle vie aeree caratterizzata da:

- Episodi ricorrenti di dispnea, respiro sibilante, tosse e senso di costrizione toracica
- Ostruzione bronchiale (di solito reversibile spontaneamente o dopo trattamento farmacologico)
- Iperreattività bronchiale
- Infiltrazione di cellule infiammatorie, rilascio di mediatori e rimodellamento strutturale delle vie aeree

Rapporto del Gruppo di Lavoro del GINA



Argomenti:

- Definizione
- **Epidemiologia ed impatto socio-economico dell'asma**
- Fattori di rischio
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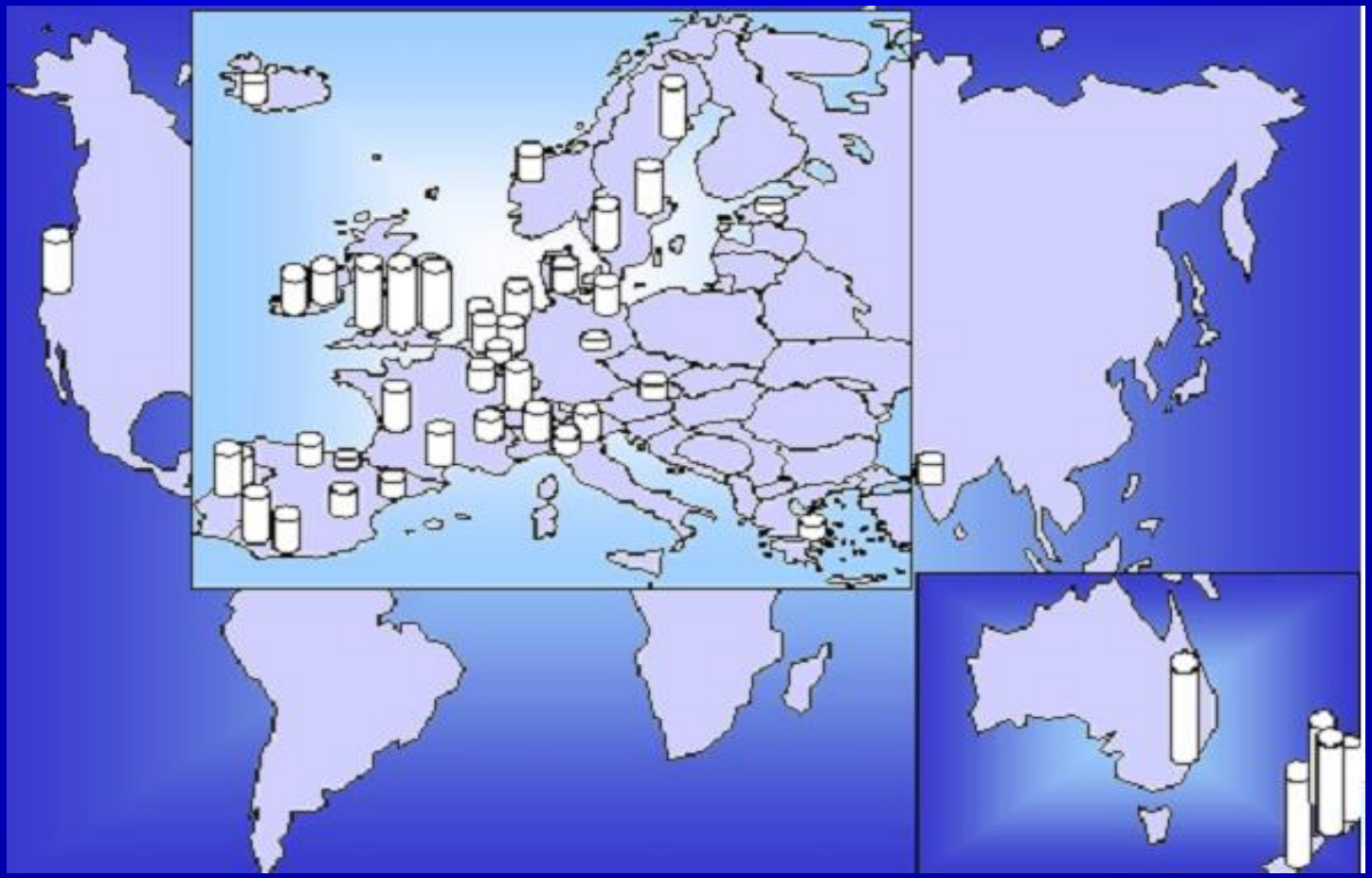
Epidemiologia dell'asma

- L'asma è una delle patologie più diffuse al mondo
- L'asma è diffusa in tutti i paesi ma varia in modo considerevole da nazione a nazione e può mostrare variazioni anche all'interno della stessa nazione
- La variazione geografica è confermata anche dalla distribuzione dell'atopia e della reattivita' bronchiale
- La variazione geografica è simile per bambini e adulti
- In Italia la prevalenza di asma è più bassa rispetto a quella di molte altre nazioni, soprattutto dei paesi anglosassoni, sia nella popolazione infantile sia negli adulti

Burden of asthma

- Asthma is one of the most common chronic diseases worldwide with an estimated 300 million affected individuals
- Prevalence is increasing in many countries, especially in children
- Asthma is a major cause of school and work absence
- Health care expenditure on asthma is very high
  - Developed economies might expect to spend 1-2 percent of total health care expenditures on asthma.
  - Developing economies likely to face increased demand due to increasing prevalence of asthma
  - Poorly controlled asthma is expensive
  - However, investment in prevention medication is likely to yield cost savings in emergency care

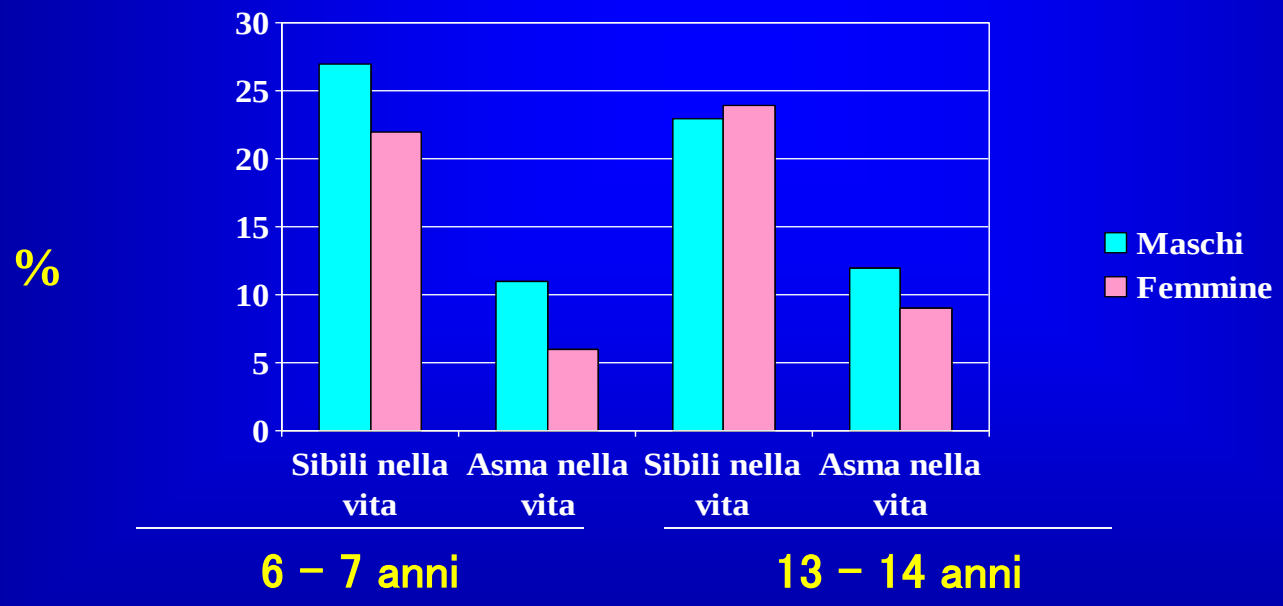
Distribuzione geografica della prevalenza dell'asma in atto – ECRHS



ECRHS – Eur Respir J 1996; 9: 687–95

Prevalenza di sibili e asma in bambini ed adolescenti italiani

Studio SIDRIA (1994-95)



SIDRIA Collaborative Group - Eur Respir J 1997; Eur Respir J 1999

Epidemiologia dell'asma

Negli ultimi 20 anni la prevalenza di asma è aumentata considerevolmente in molti paesi, soprattutto nei bambini

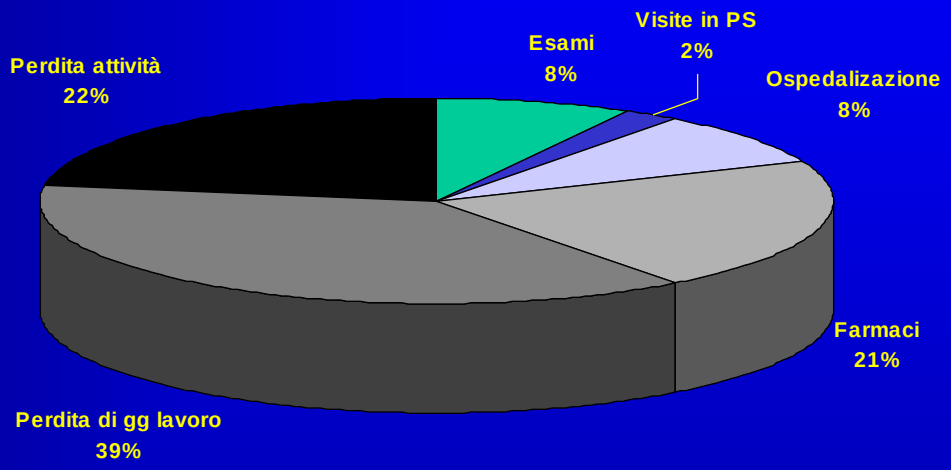
Epidemiologia dell'asma

- Alcune evidenze, anche italiane, sembrerebbero documentare che la prevalenza di asma e delle manifestazioni asmatiche non e' attualmente in ulteriore aumento
- La stabilizzazione della prevalenza della sintomatologia asmatica, secondo alcuni studi, anche italiani, essere associata sembra all'incremento dei trattamenti antiasmatici

Epidemiologia dell’asma

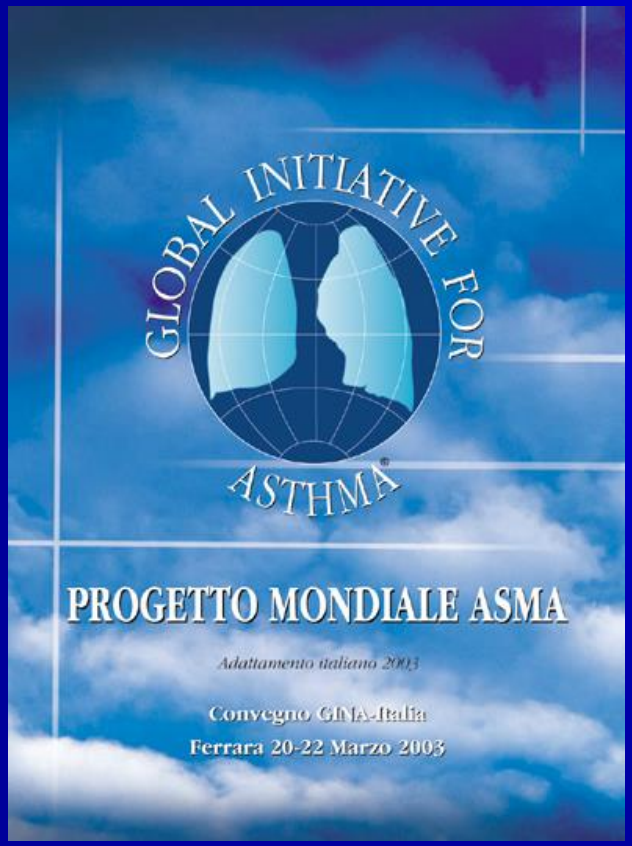
L’attuale prevalenza di asma in Italia, benché inferiore a quella di molte altre nazioni, rappresenta una notevole fonte di costi sia sociali sia umani

Componenti del costo medio annuale di un paziente adulto asmatico in Italia
(studio ISAYA)



Fonte: ISAYA

Rapporto del Gruppo di Lavoro del GINA



Argomenti:

- Definizione
- Epidemiologia ed impatto socio-economico dell'asma
- **Fattori di rischio**
- Patogenesi (anatomia patologica)
- Diagnosi e Classificazione
- Educazione del paziente e somministrazione delle cure
- Programma di trattamento dell'asma in sei parti
- Raccomandazioni per la ricerca

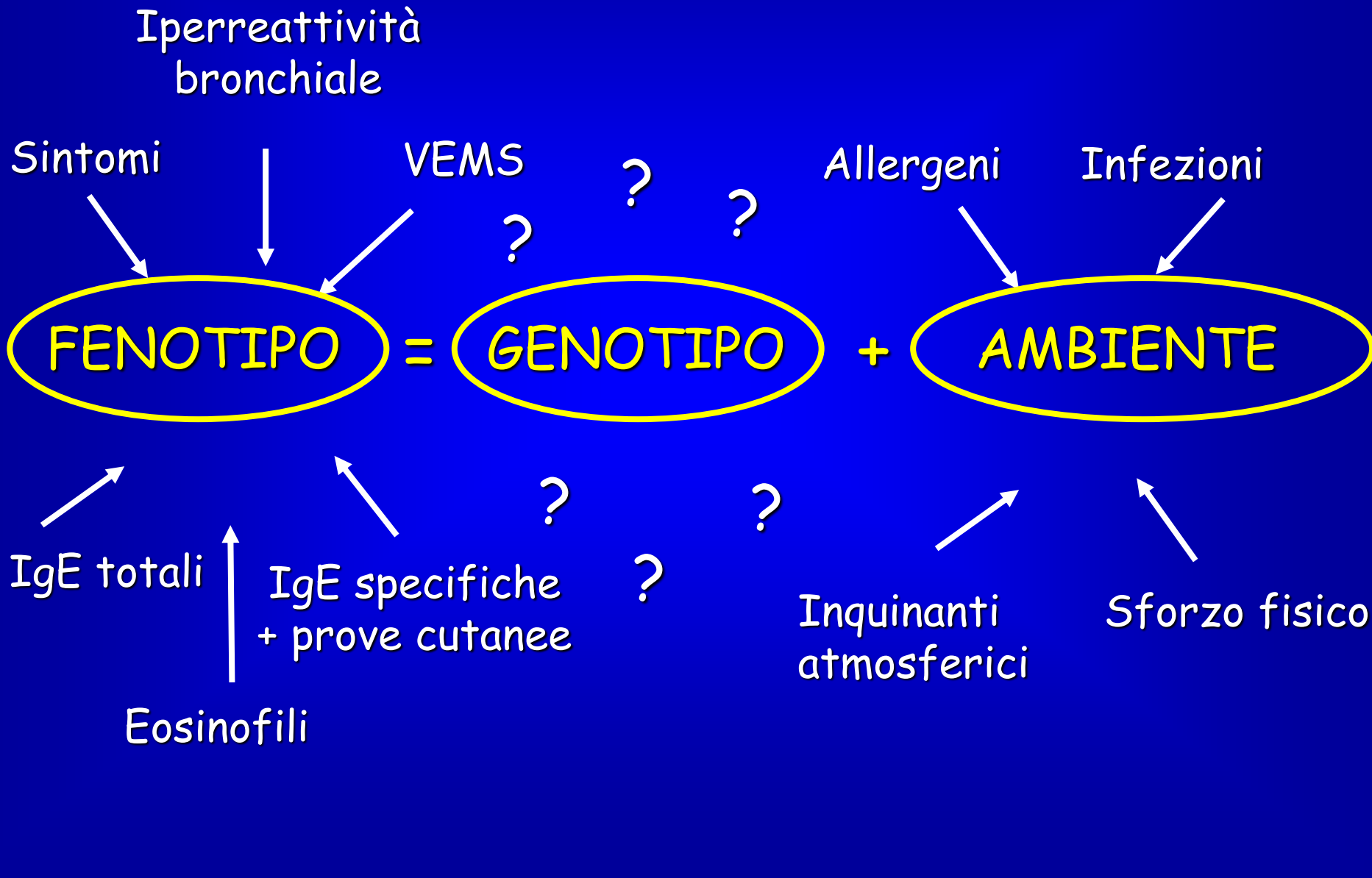
Fattori di rischio di asma

- Fattori individuali: predispongono l'individuo all'asma
- Fattori ambientali:

  - influenzano la possibilità di sviluppare asma in soggetti predisposti,

  - scatenano le riacutizzazioni e/o causano la persistenza dei sintomi

ASMA = MALATTIA GENETICA COMPLESSA



Fattori di rischio di asma

Fattori individuali

- Predisposizione genetica
- Atopia
- Iperresponsività delle vie aeree
- Sesso
- Razza/etnia

Fattori ambientali

- Allergeni
- Sensibilizzanti professionali
- Fumo di tabacco
- Inquinamento atmosferico
- Infezioni delle vie respiratorie
- Fattori socio-economici
- Dimensioni del nucleo familiare
- Additivi alimentari e farmaci
- Obesità
- Infezioni parassitarie

Fattori in grado di indurre riacutizzazioni asmatiche

- Infezioni delle vie respiratorie
- Allergeni
- Inquinanti atmosferici interni (fumo, ecc..)
  ed esterni (urbani, industriali, ecc..)
- Esercizio fisico
- Fattori meteorologici
- Farmaci
- Alimenti

Riacutizzazioni asmatiche e virus respiratori

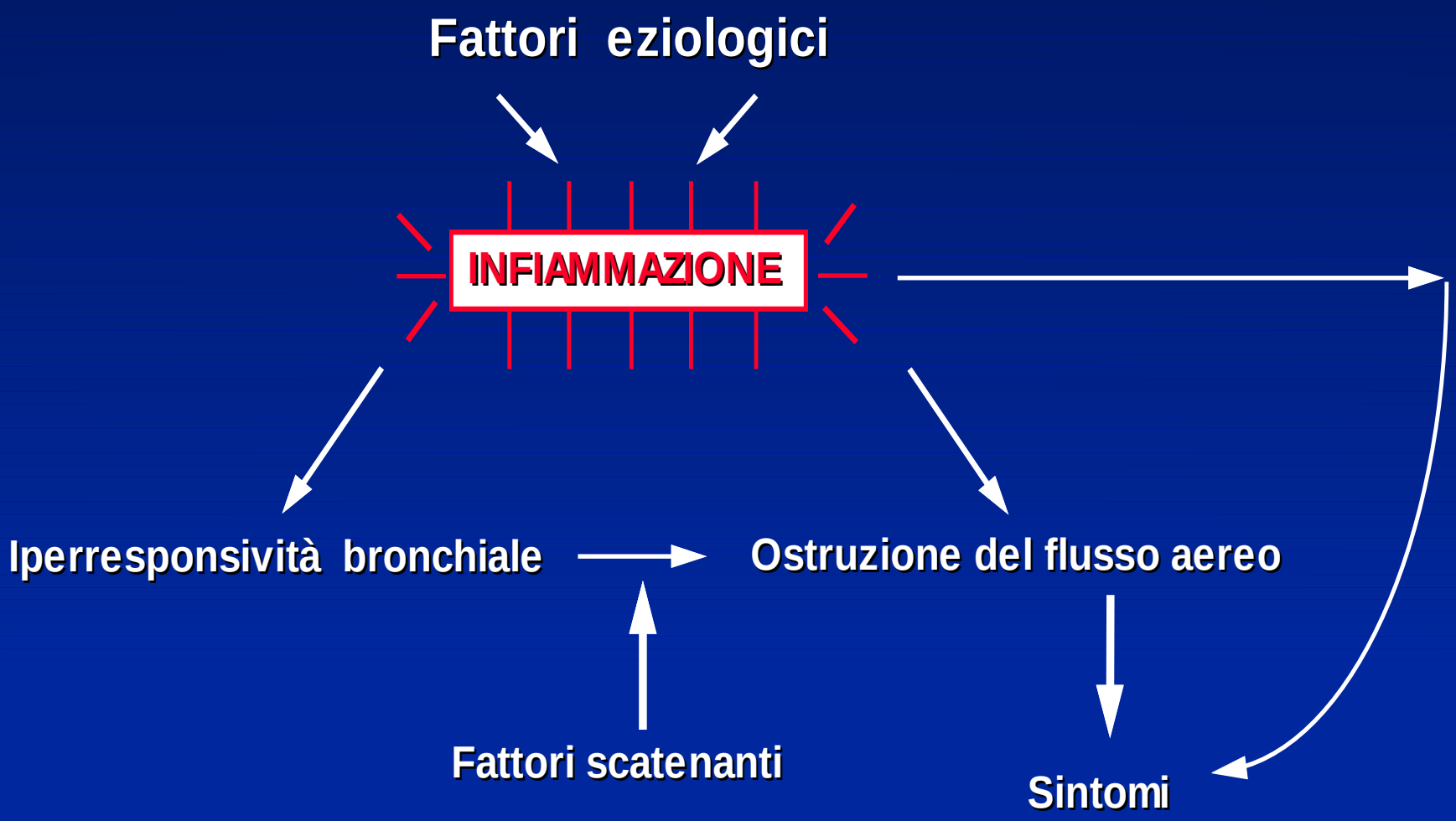
- Le infezioni virali sono causa frequente di riacutizzazioni asmatiche
- I soggetti asmatici sono più suscettibili all'infezione da rinovirus
- E' dimostrato un sinergismo tra infezioni virali ed esposizione ad allergeni nell'indurre le riacutizzazioni e nel determinare la gravità delle riacutizzazioni

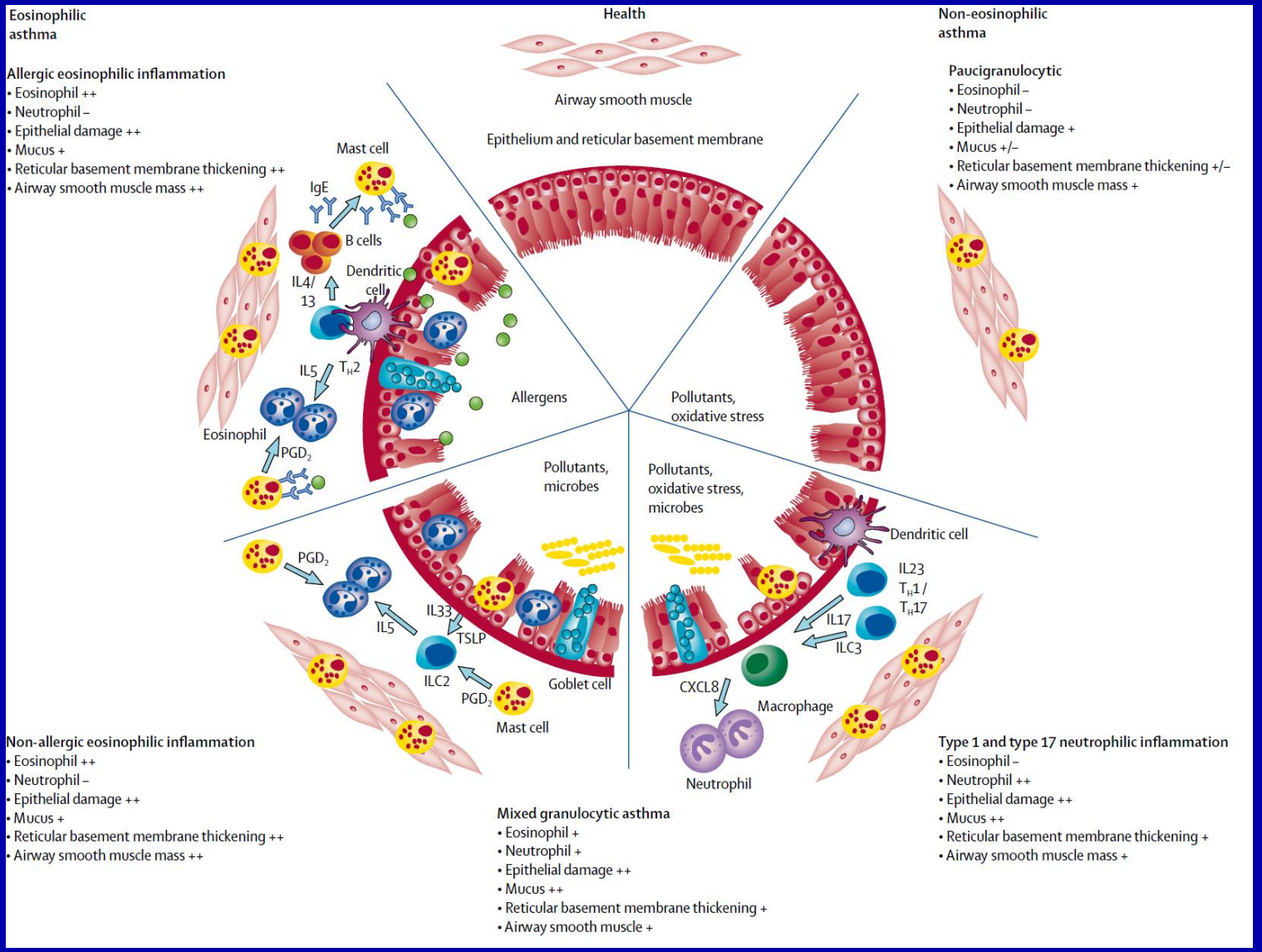
Progetto Mondiale Asma

- Epidemiologia
- Definizione
- **CAUSE E MECCANISMI**
- Diagnosi
- Classificazione
- Trattamento
- Istruzione del paziente
- Prevenzione
- Aspetti socio-economici
- Organizzazione sanitaria

Progetto Mondiale Asma

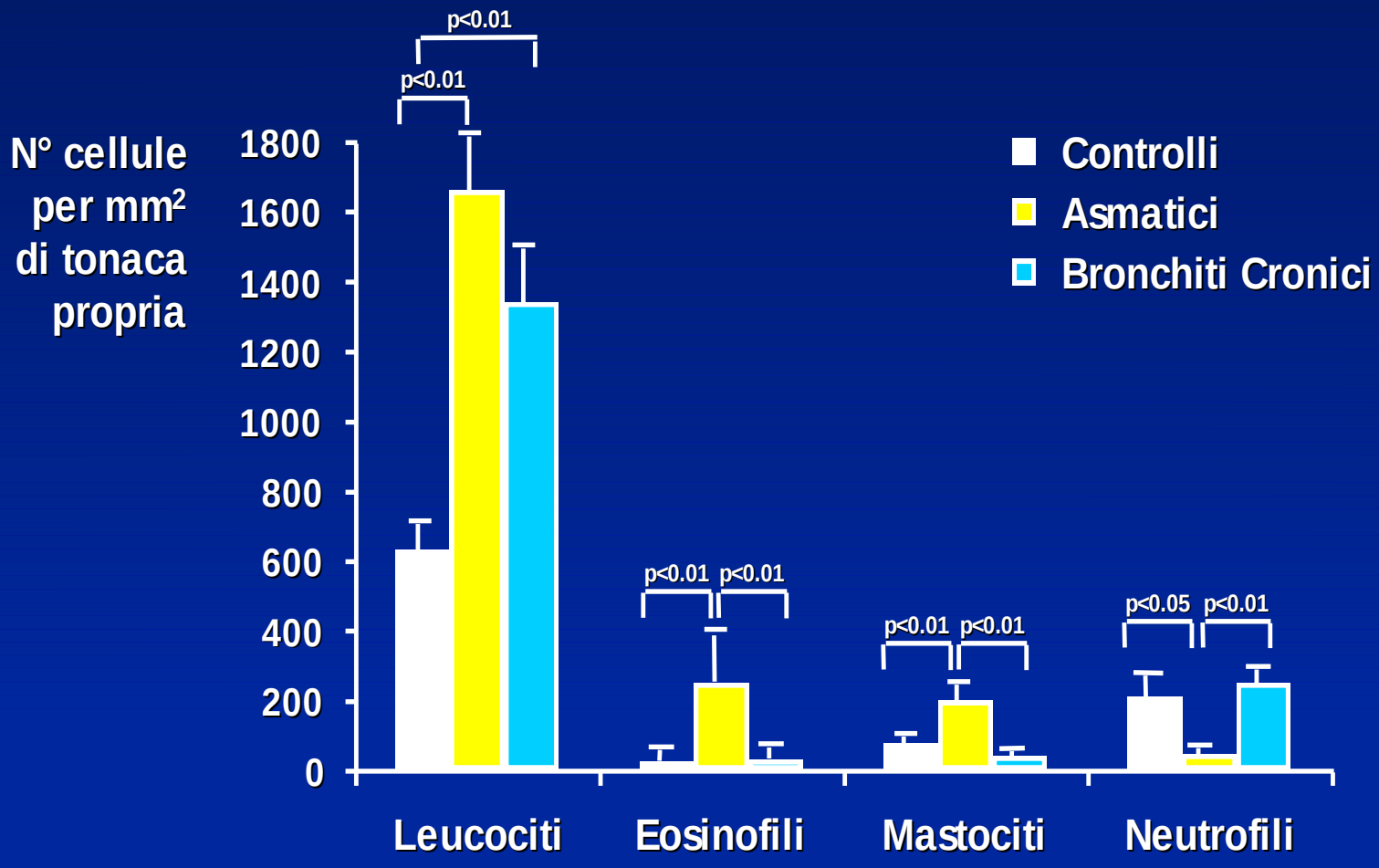
PATOGENESI




Health
Airway smooth muscle
Epithelium and reticular basement membrane
Eosinophilic asthma
Allergic eosinophilic inflammation
• Eosinophil ++
• Neutrophil –
• Epithelial damage ++
• Mucus +
• Reticular basement membrane thickening ++
• Airway smooth muscle mass ++
Mast cell
IgE
B cells
IL4/13
Dendritic cell
IL5
TH2
Eosinophil
PGD2
Allergens
Non-eosinophilic asthma
Paucigranulocytic
• Eosinophil –
• Neutrophil –
• Epithelial damage +
• Mucus +/–
• Reticular basement membrane thickening +/–
• Airway smooth muscle mass +
Pollutants, oxidative stress
Pollutants, microbes
PGD2
IL5
IL33/TSLP
ILC2
PGD2
Mast cell
Goblet cell
Pollutants, oxidative stress, microbes
Dendritic cell
IL23
TH1/TH17
IL17
ILC3
CXCL8
Macrophage
Neutrophil
Non-allergic eosinophilic inflammation
• Eosinophil ++
• Neutrophil –
• Epithelial damage ++
• Mucus +
• Reticular basement membrane thickening ++
• Airway smooth muscle mass ++
Mixed granulocytic asthma
• Eosinophil +
• Neutrophil +
• Epithelial damage ++
• Mucus ++
• Reticular basement membrane thickening +
• Airway smooth muscle +
Type 1 and type 17 neutrophilic inflammation
• Eosinophil –
• Neutrophil ++
• Epithelial damage ++
• Mucus ++
• Reticular basement membrane thickening +
• Airway smooth muscle mass +

Progetto Mondiale Asma

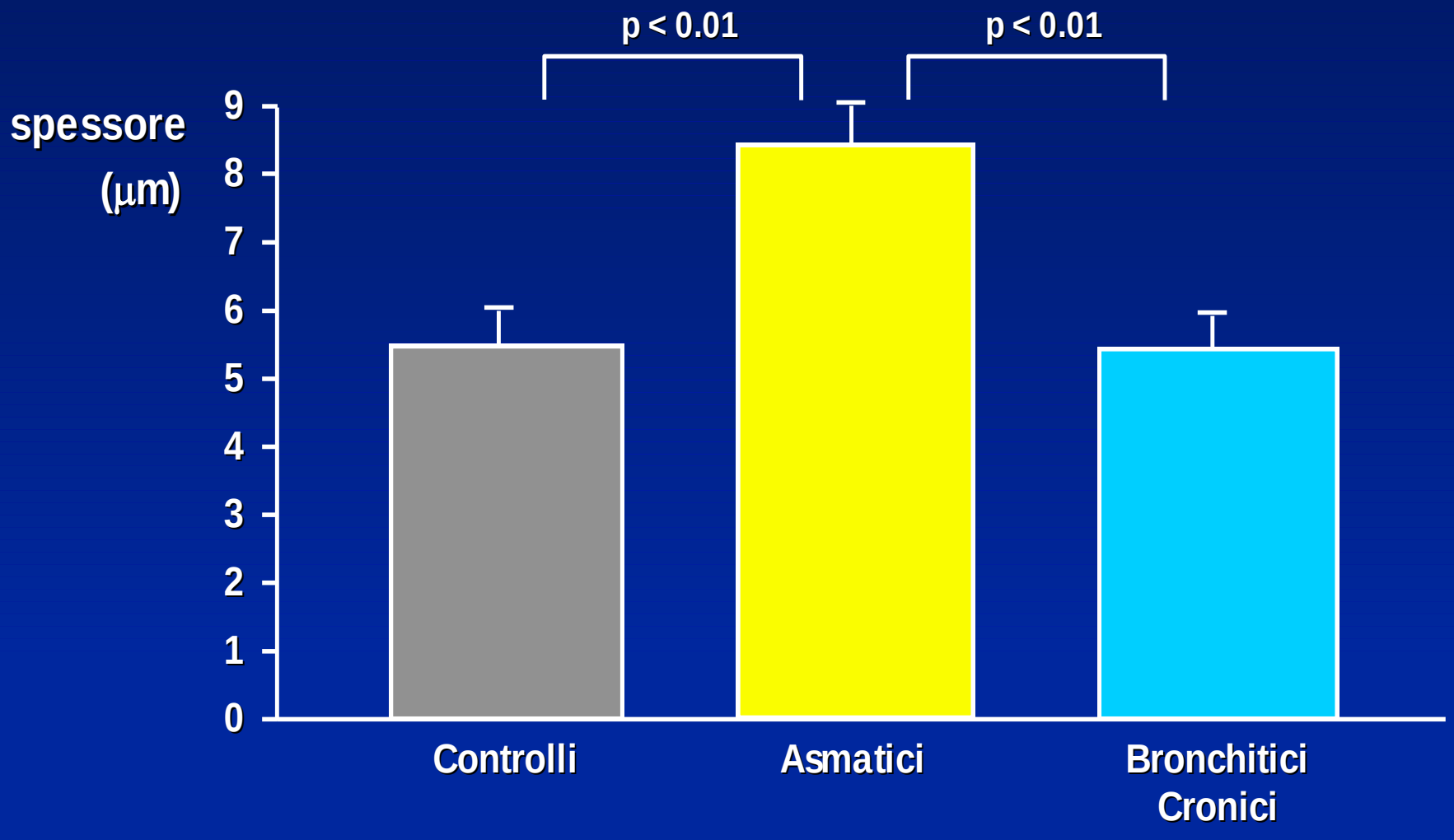
QUADRO ANATOMO - PATOLOGICO



Progetto Mondiale Asma

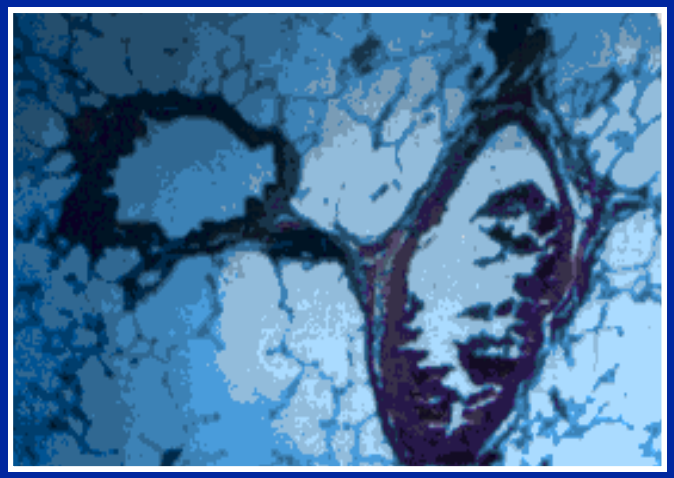
QUADRO ANATOMO - PATOLOGICO

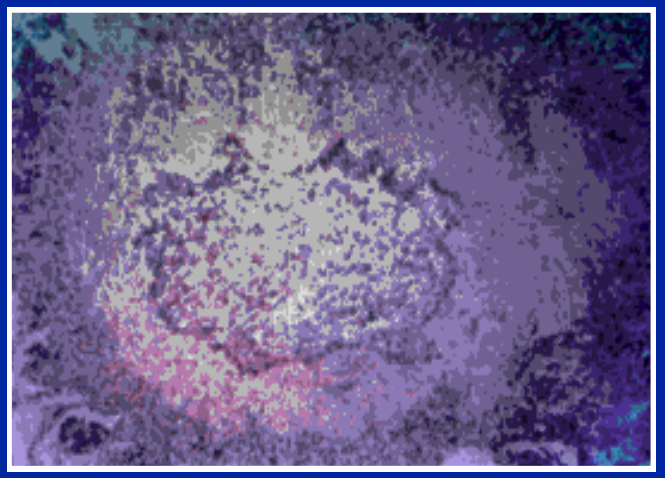
Membrana basale dell'epitelio bronchiale

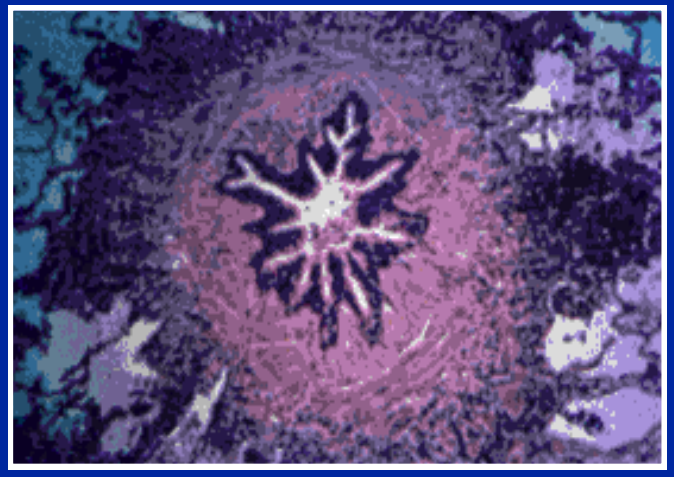


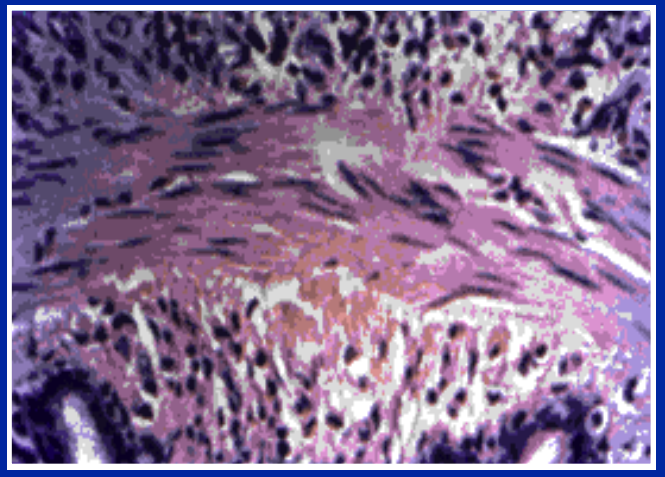
Progetto Mondiale Asma

MORTE PER ASMA

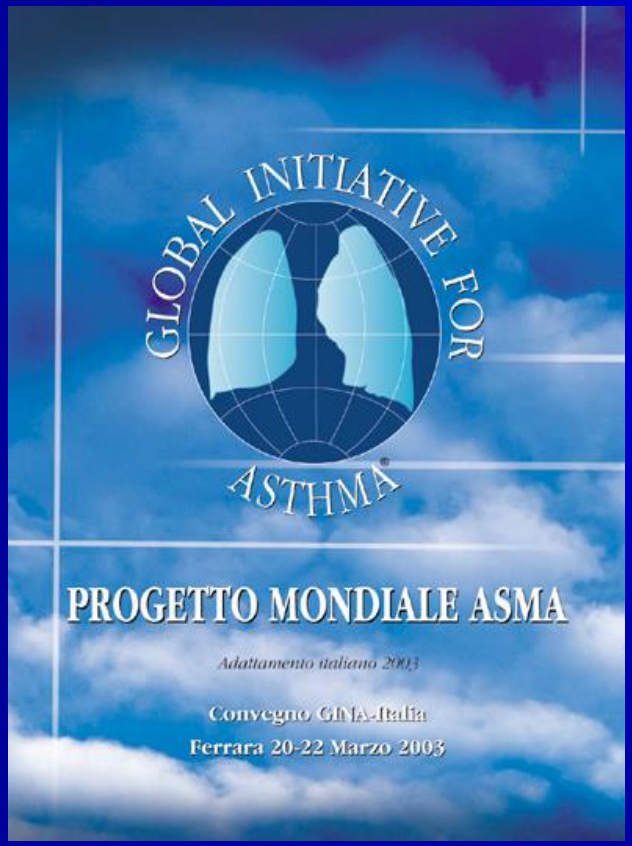








Rapporto del Gruppo di Lavoro del GINA



Argomenti:

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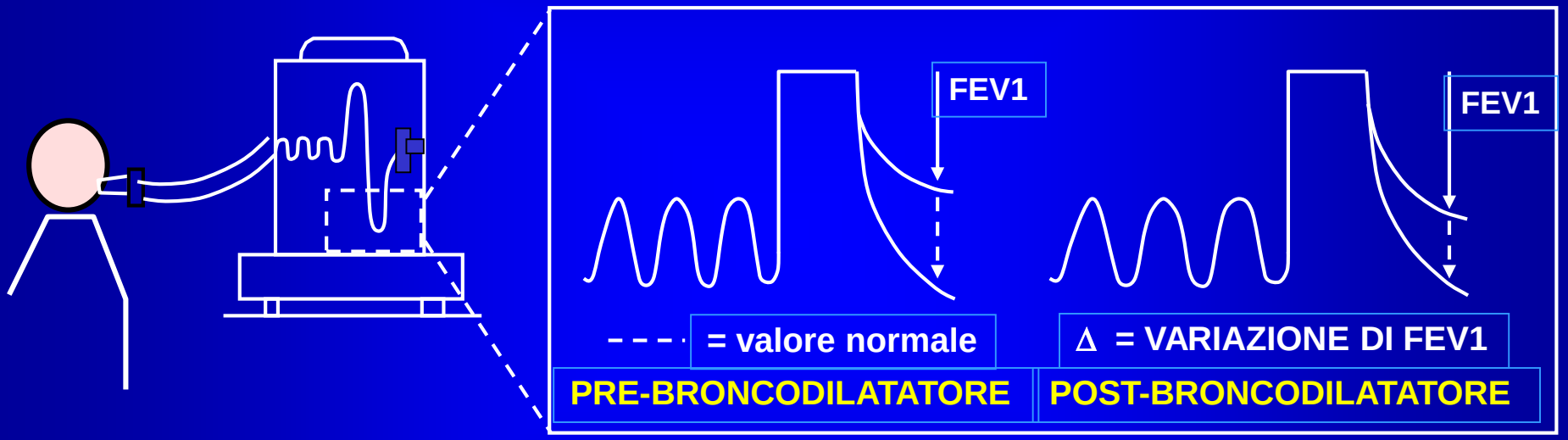
BRONCOPNEUMOPATIA CRONICA OSTRUTTIVA



OSTRUZIONE BRONCHIALE
reversibile

Progetto Mondiale Asma

DIAGNOSI CLINICA DI ASMA

- Anamnesi ed esame clinico
- Prove funzionali respiratorie ± broncodilatatore

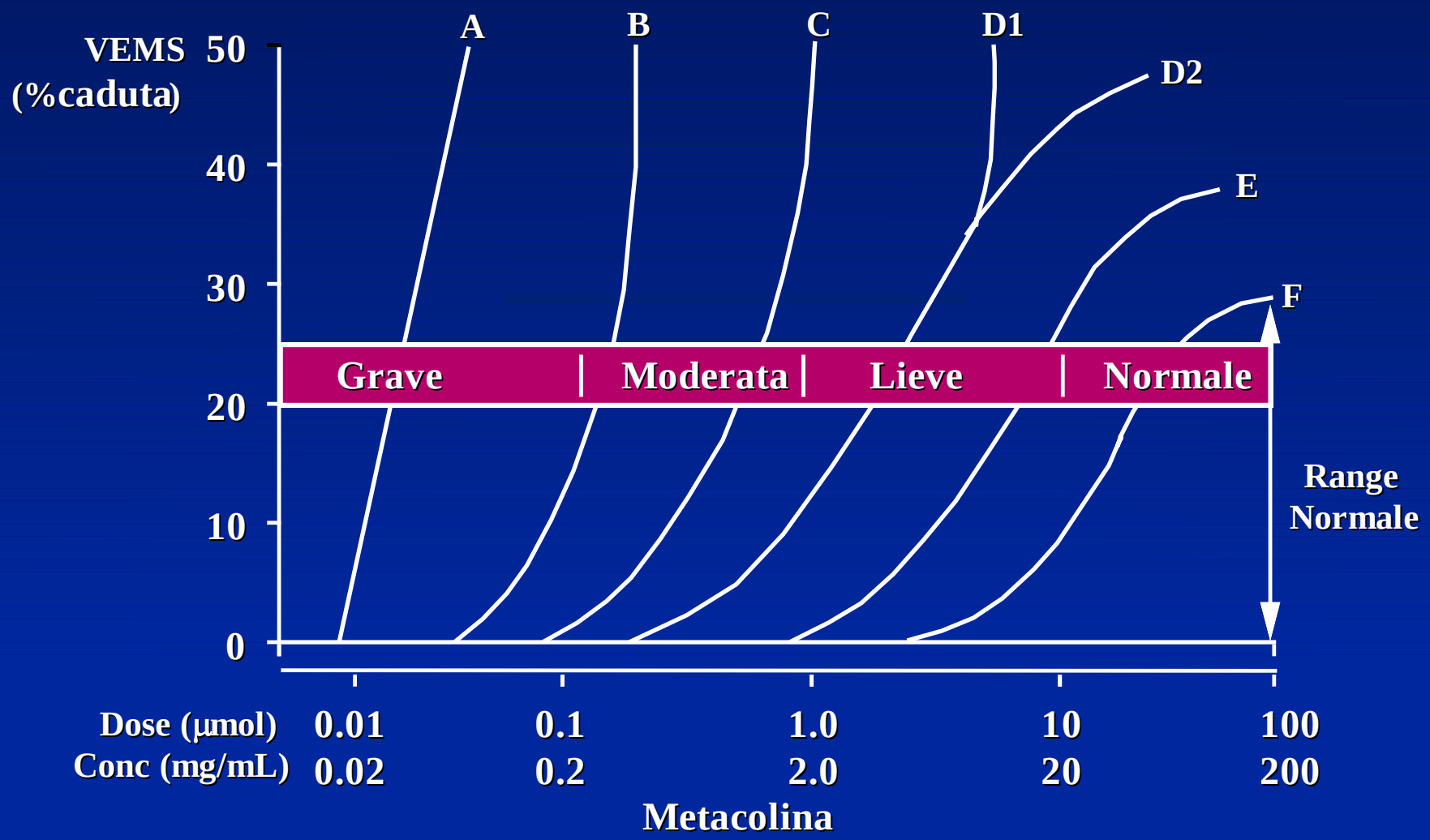
CASI DUBBI:

- Test con metacolina
- Risposta alla terapia antiasmatica

DIAGNOSI EZIOLOGICA

Progetto Mondiale Asma

TEST ALLA METACOLINA



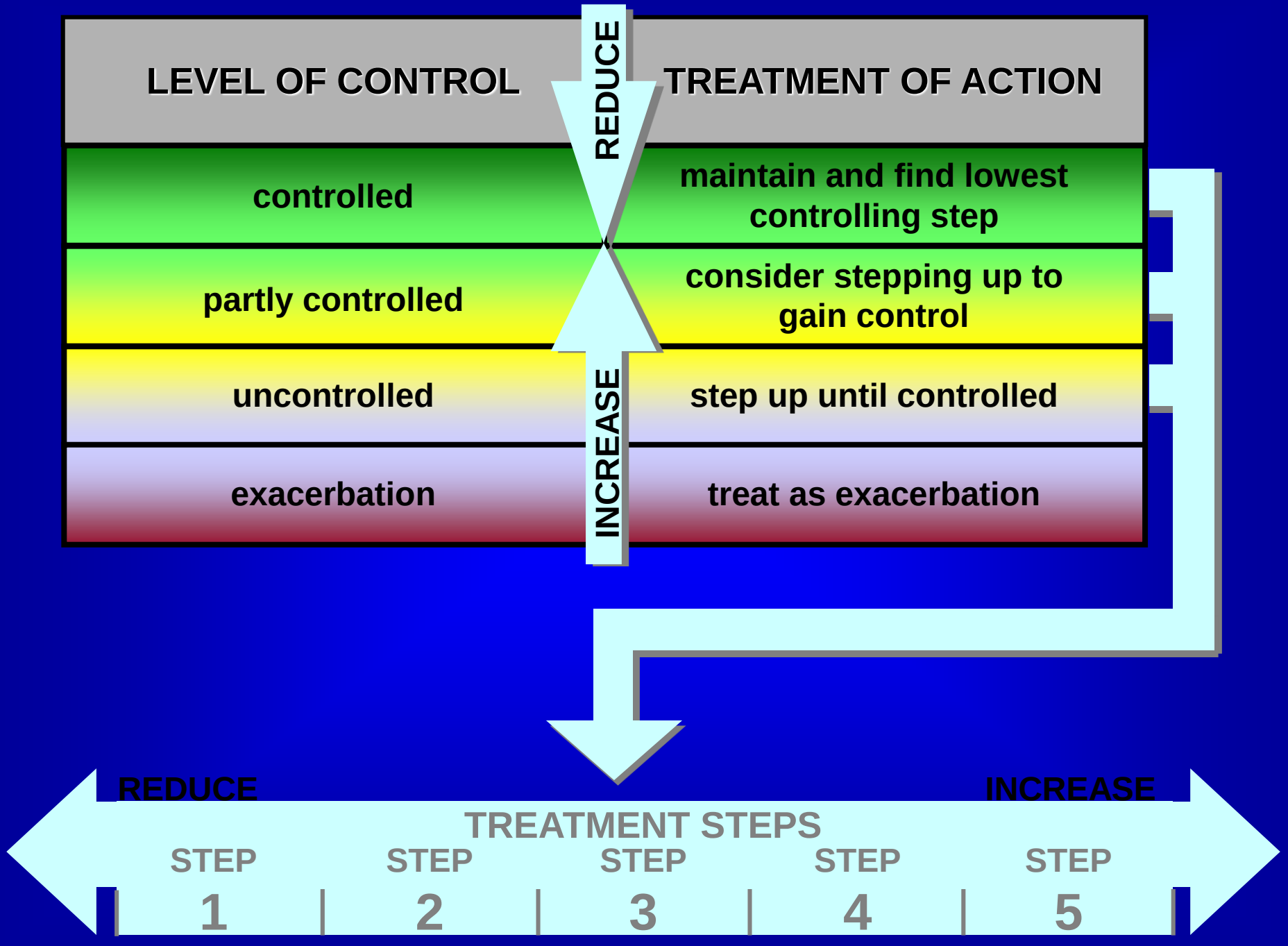
Classificazione di Gravità

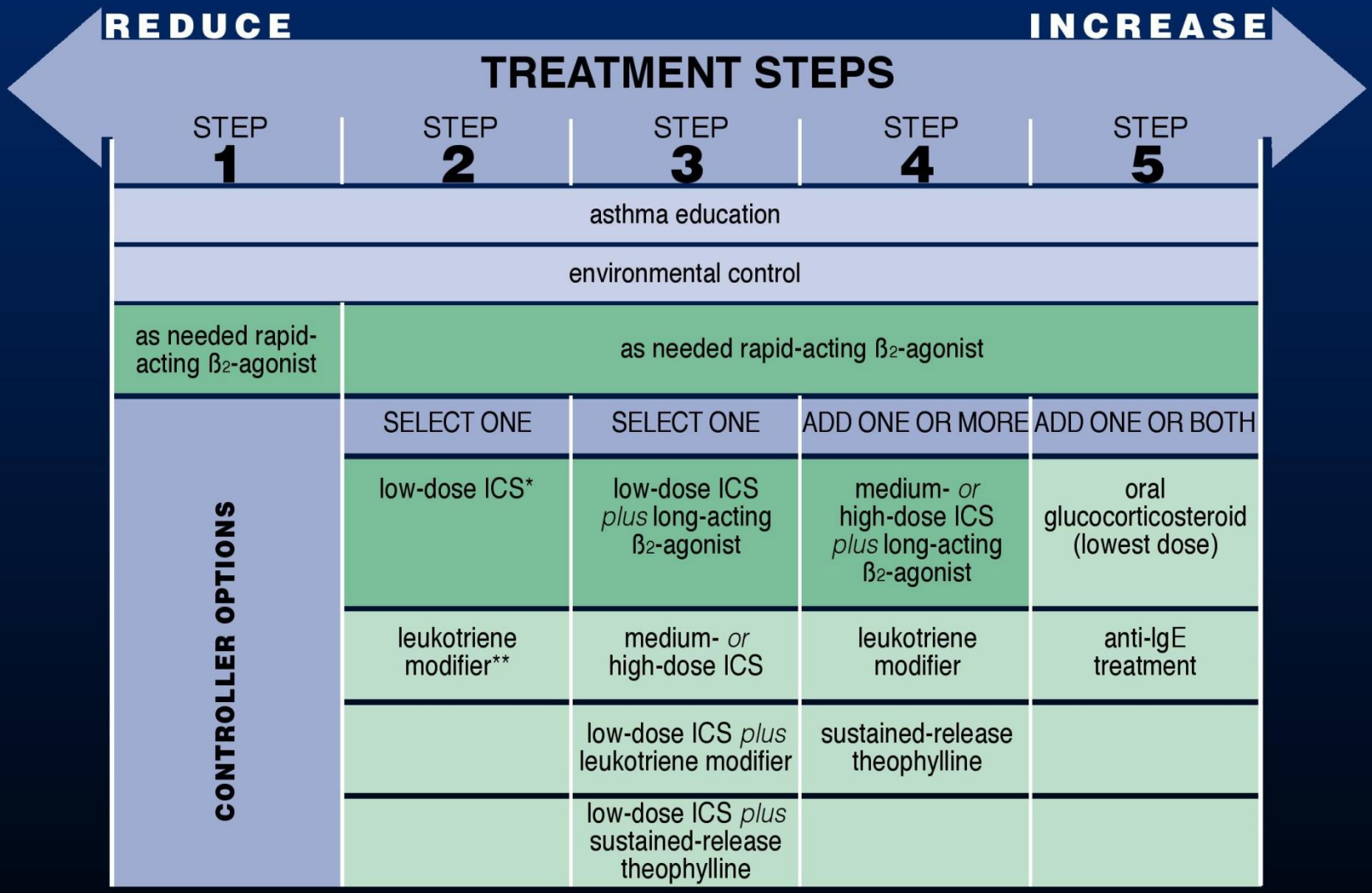
CLASSIFICAZIONE DI GRAVITA' Caratteristiche cliniche in assenza di terapia			
	Sintomi	**Sintomi notturni**	**FEV_1 o PEF**
STEP 4 **Grave Persistente**	**Continui** **Attività fisica limitata**	**Frequenti**	**≤ 60% predetto** **Variabilità > 30%**
STEP 3 **Moderato Persistente**	**Quotidiani** **Attacchi che limitano L'attività**	**➢1 volta** **Alla settimana**	**60 - 80% predetto** **Variabilità > 30%**
STEP 2 **Lieve Persistente**	**> 1 volta/settimana ma < 1 volta / giorno**	**> 2 volte al mese**	**≥ 80% predetto** **Variabilità 20 - 30%**
STEP 1 **Intermittente**	**< 1 volta/settimana** **Asintomatico e con normale PEF tra gli attacchi**	**≤ 2 volte al mese**	**≥ 80% predetto** **Variabilita < 20%**

La presenza di almeno uno dei criteri di gravità è sufficiente per classificare un paziente in un determinato livello di gravità

Levels of Asthma Control

Characteristic	Controlled (All of the following)	Partly controlled (Any present in any week)	Uncontrolled
Daytime symptoms	None (2 or less / week)	More than twice / week	3 or more features of partly controlled asthma present in any week
Limitations of activities	None	Any	
Nocturnal symptoms / awakening	None	Any	
Need for rescue / "reliever" treatment	None (2 or less / week)	More than twice / week	
Lung function (PEF or FEV_1)	Normal	< 80% predicted or personal best (if known) on any day	
Exacerbation	None	One or more / year	1 in any week

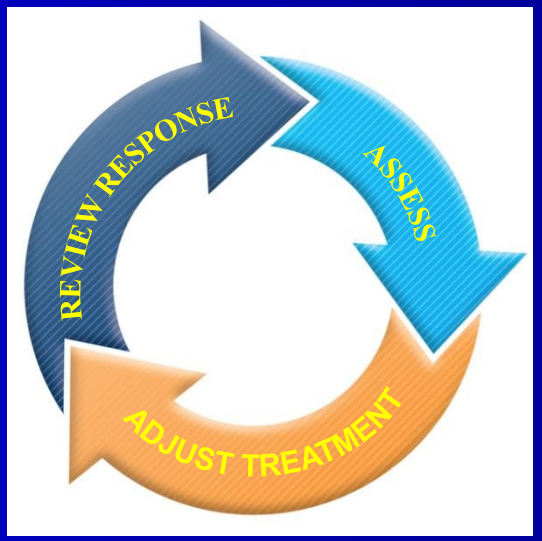

LEVEL OF CONTROL
TREATMENT OF ACTION
REDUCE
controlled
maintain and find lowest controlling step
partly controlled
consider stepping up to gain control
uncontrolled
step up until controlled
exacerbation
treat as exacerbation
INCREASE
REDUCE
INCREASE
TREATMENT STEPS
STEP 1
STEP 2
STEP 3
STEP 4
STEP 5



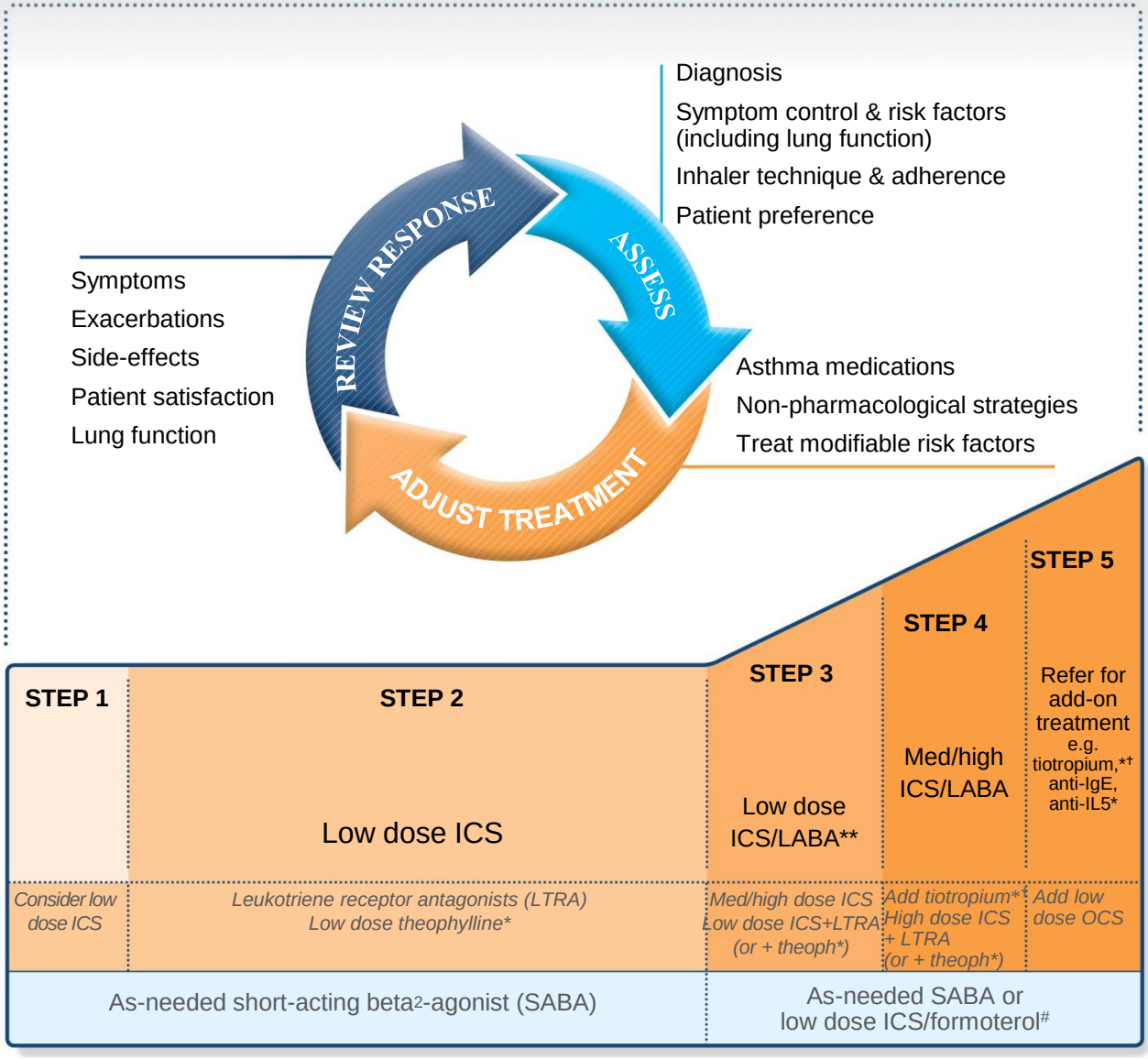
*inhaled glucocorticosteroids
** receptor antagonist or synthesis inhibitors

Treating to control symptoms and minimize risk

- Establish a patient-doctor partnership
- Manage asthma in a continuous cycle:
  - **Assess**
  - **Adjust** treatment (pharmacological and non-pharmacological)
  - **Review** the response
- Teach and reinforce essential skills
  - Inhaler skills
  - Adherence
  - Guided self-management education
    - Written asthma action plan
    - Self-monitoring
    - Regular medical review



Stepwise management - pharmacotherapy



*Not for children <12 years

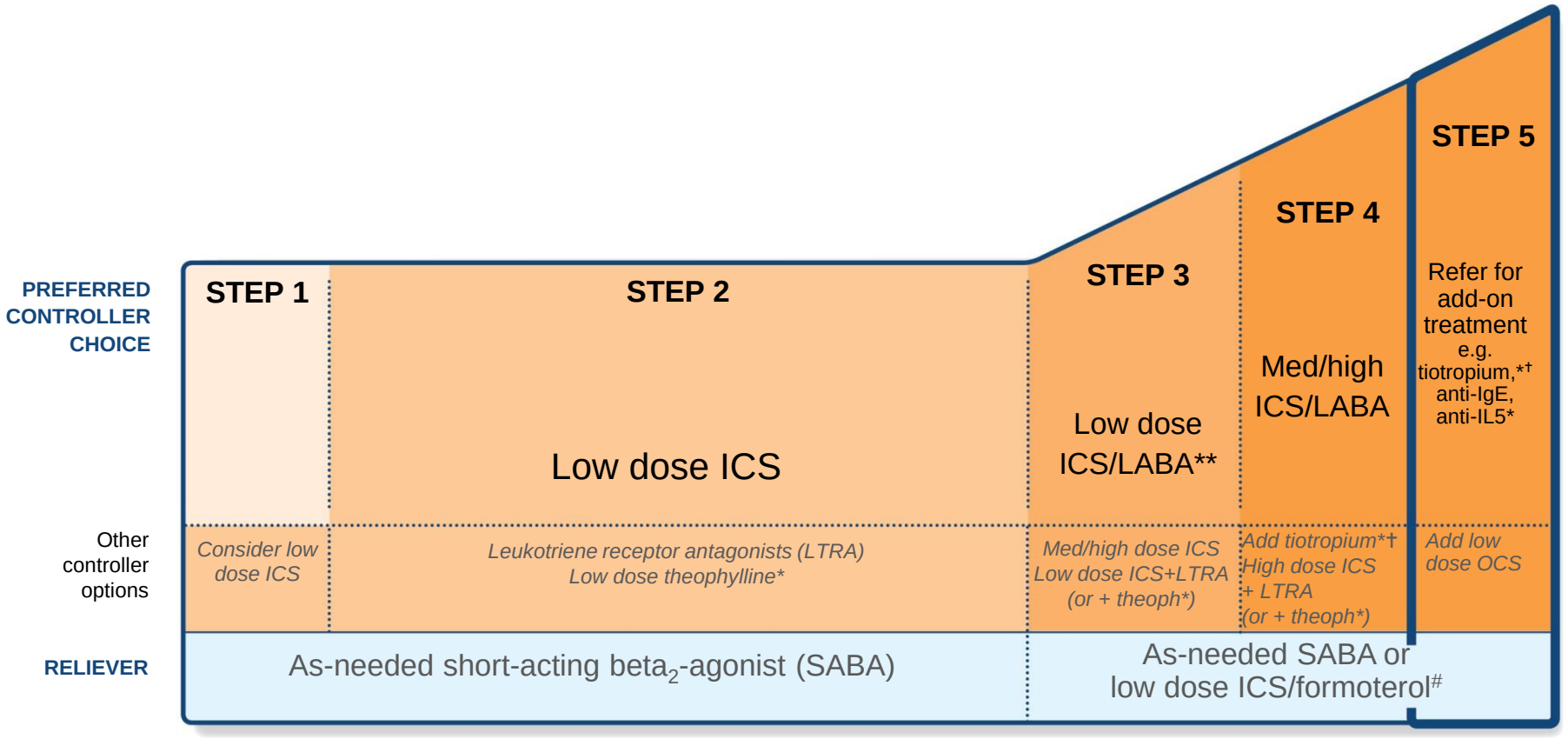
**For children 6-11 years, the preferred Step 3 treatment is medium dose ICS

#For patients prescribed BDP/formoterol or BUD/formoterol maintenance and reliever therapy

† Tiotropium by mist inhaler is an add-on treatment for patients ≥12 years with a history of exacerbations

Step 5 – higher level care and/or add-on treatment

UPDATED 2017



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#For patients prescribed BDP/formoterol or BUD/ formoterol maintenance and reliever therapy

† Tiotropium by mist inhaler is an add-on treatment for patients ≥12 years with a history of exacerbations

Provide hands-on inhaler skills training

Choose

- Choose an appropriate device before prescribing. Consider medication options, arthritis, patient skills and cost. For ICS by pMDI, prescribe a spacer
- Avoid multiple different inhaler types if possible

Provide hands-on inhaler skills training

Choose

- Choose an appropriate device before prescribing. Consider medication options, arthritis, patient skills and cost. For ICS by pMDI, prescribe a spacer
- Avoid multiple different inhaler types if possible

Check

- Check technique at every opportunity – "*Can you show me how you use your inhaler at present?*"
- Identify errors with a device-specific checklist

Correct

- Give a physical demonstration to show how to use the inhaler correctly
- Check again (up to 2-3 times)
- Re-check inhaler technique frequently, as errors often recur within 4-6 weeks

Confirm

- Can you demonstrate correct technique for the inhalers you prescribe?
- Brief inhaler technique training improves asthma control

Check adherence with asthma medications

- Poor adherence:
  - Is very common: it is estimated that 50% of adults and children do not take controller medications as prescribed
  - Contributes to uncontrolled asthma symptoms and risk of exacerbations and asthma-related death
- Contributory factors
  - Unintentional (e.g. forgetfulness, cost, confusion) and/or
  - Intentional (e.g. no perceived need, fear of side-effects, cultural issues, cost)
- How to identify patients with low adherence:
  - Ask an empathic question, e.g. "*Do you find it easier to remember your medication in the morning or the evening?*", or "*Would you say you are taking it 3 days a week, or less, or more?*"
  - Check prescription date, label date and dose counter
  - Ask patient about their beliefs and concerns about the medication

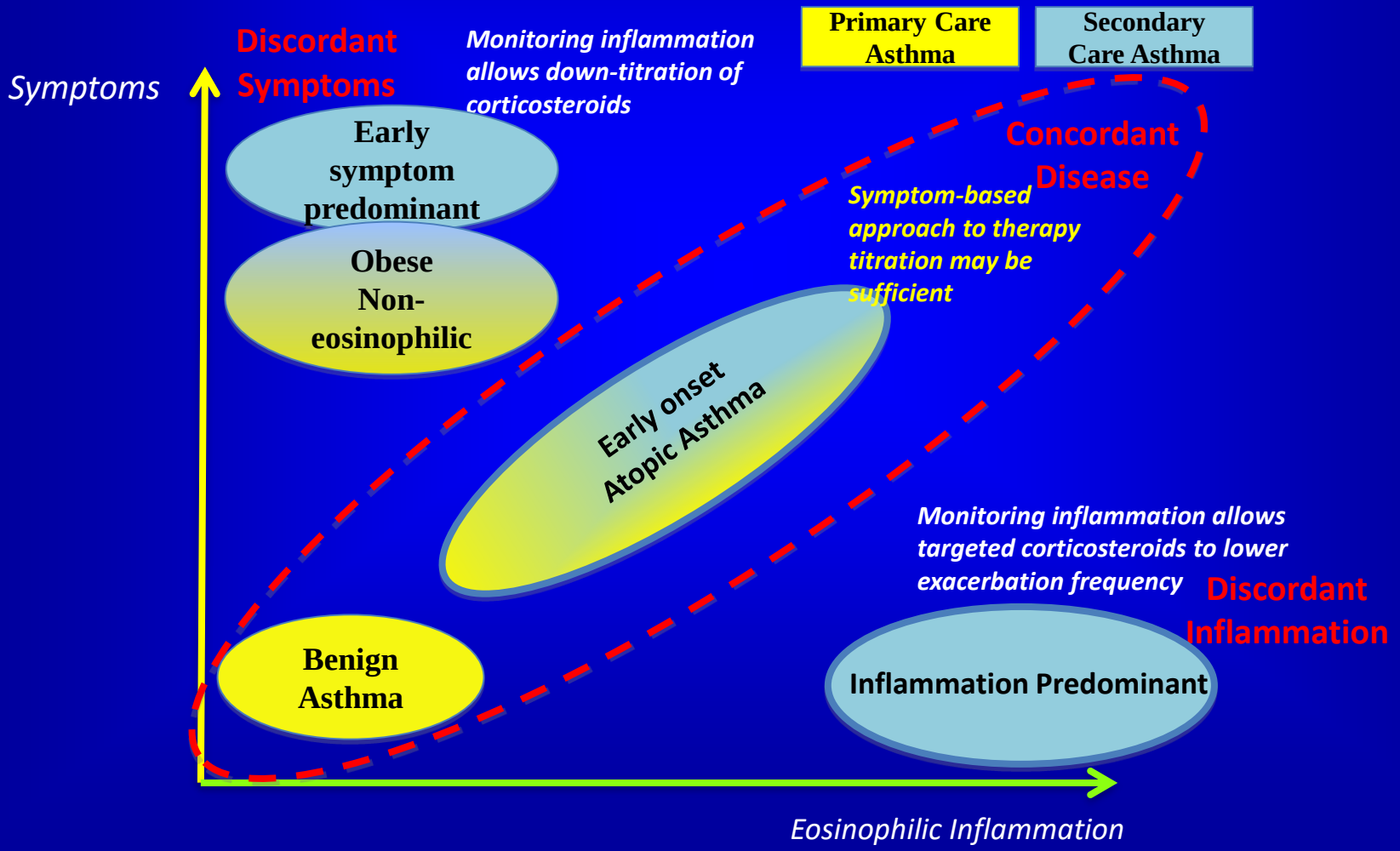
Strategies to improve adherence in asthma

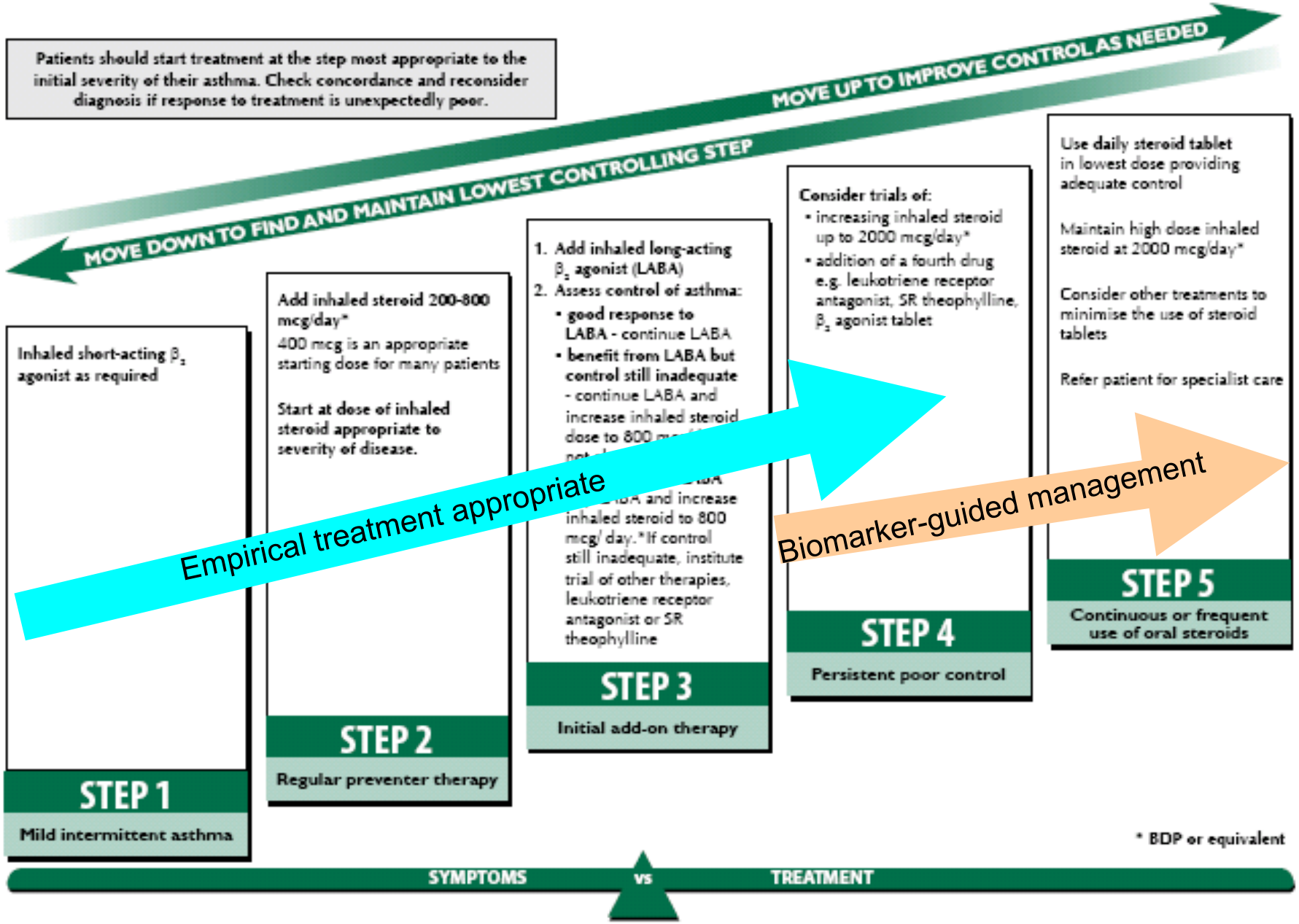
- Only a few interventions have been studied closely in asthma and found to be effective for improving adherence
  - Shared decision-making
  - Comprehensive asthma education with nurse home visits
  - Inhaler reminders for missed doses
  - Reviewing patients' detailed dispensing records

✓ Where is the need? Not in mild/moderate asthma

" A symptom based approach would be effective for mild to moderate asthma,… where concordance was observed between inflammation and symptoms"

Haldar P, AJRCCM 2008




Patients should start treatment at the step most appropriate to the initial severity of their asthma. Check concordance and reconsider diagnosis if response to treatment is unexpectedly poor.
MOVE UP TO IMPROVE CONTROL AS NEEDED
MOVE DOWN TO FIND AND MAINTAIN LOWEST CONTROLLING STEP
Inhaled short-acting β_2 agonist as required
STEP 1
Mild intermittent asthma
Add inhaled steroid 200-800 mcg/day*
400 mcg is an appropriate starting dose for many patients
Start at dose of inhaled steroid appropriate to severity of disease.
STEP 2
Regular preventer therapy
1. Add inhaled long-acting β_2 agonist (LABA)
2. Assess control of asthma:
• good response to LABA - continue LABA
• benefit from LABA but control still inadequate - continue LABA and increase inhaled steroid dose to 800
and increase inhaled steroid to 800 mcg/ day.*If control still inadequate, institute trial of other therapies, leukotriene receptor antagonist or SR theophylline
STEP 3
Initial add-on therapy
Consider trials of:
• increasing inhaled steroid up to 2000 mcg/day*
• addition of a fourth drug e.g. leukotriene receptor antagonist, SR theophylline, β_2 agonist tablet
STEP 4
Persistent poor control
Use daily steroid tablet in lowest dose providing adequate control
Maintain high dose inhaled steroid at 2000 mcg/day*
Consider other treatments to minimise the use of steroid tablets
Refer patient for specialist care
STEP 5
Continuous or frequent use of oral steroids
Empirical treatment appropriate
Biomarker-guided management
* BDP or equivalent
SYMPTOMS
vs
TREATMENT

ERS/ATS definition of severe asthma

'Asthma which requires treatment with guidelines suggested medications for GINA steps 4–5 asthma (high-dose inhaled corticosteroids and long-acting β_2-agonists or leukotriene modifier/theophylline) for the previous year or systemic corticosteroids for ≥50% of the previous year to prevent it from becoming "uncontrolled" or which remains "uncontrolled" despite this therapy'

Note: among patients aged 6 years and older

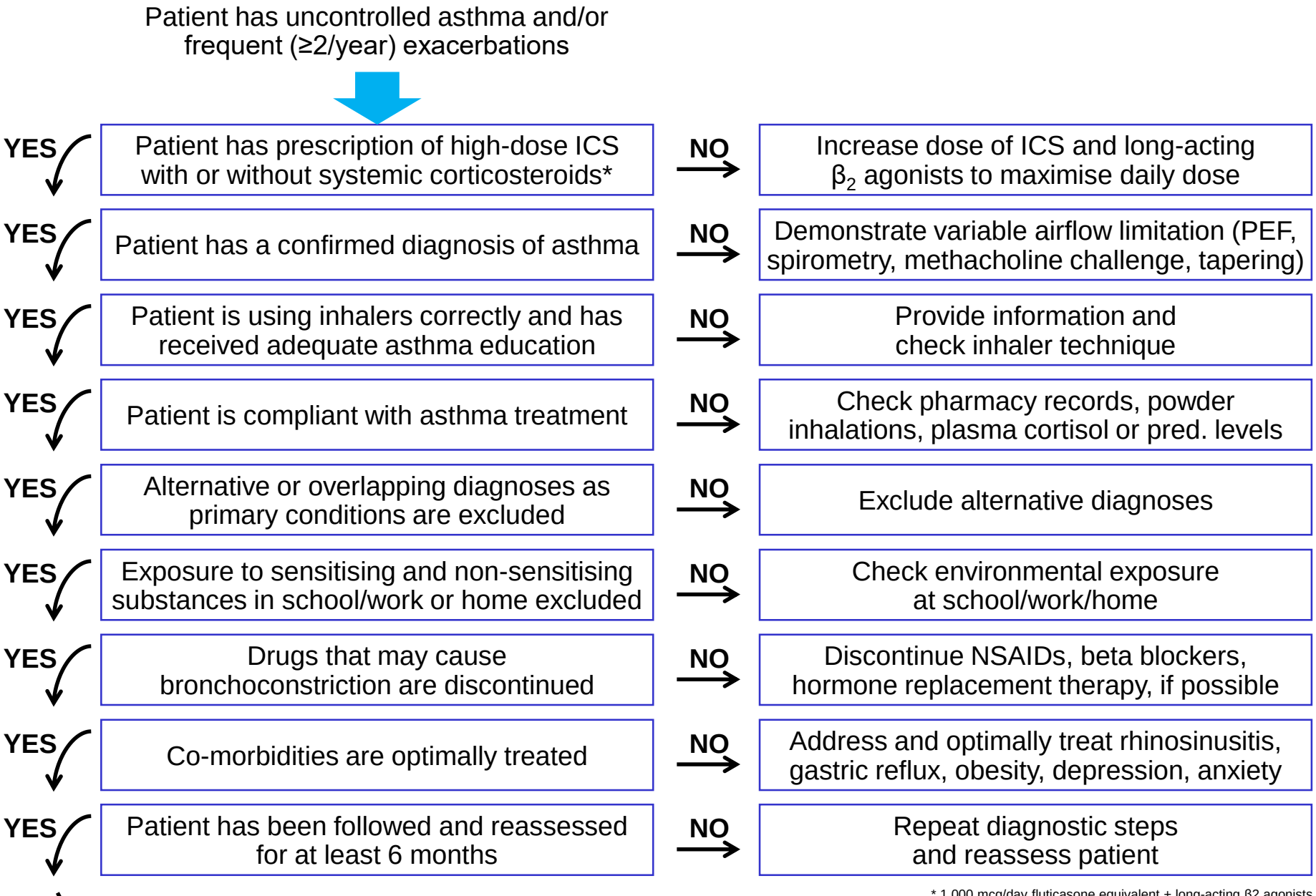
Chung KF et al. Eur Respir J 2014;43:343–73

ERS/ATS definition of uncontrolled asthma

- A patient is deemed to have uncontrolled asthma if at least one of the following features is present:

Poor symptom control	**Frequent severe exacerbations**
Serious exacerbations	**Airflow limitation**

Chung KF et al. Eur Respir J 2014;43:343−73



* 1,000 mcg/day fluticasone equivalent + long-acting β2 agonists or other controllers (adults). ICS = inhaled corticosteroids; NSAID = non-steroidal anti-inflammatory drug; PEF = peak expiratory flow.

Bel EH et al. Thorax 2011;66:910–7.

Factors to consider prior to a diagnosis of severe asthma

- Is asthma the true diagnosis?
  - Exclude differential diagnoses including COPD, vocal cord dysfunction, bronichiolitis (in children)
  - Complete pulmonary function tests, reversible airflow limitation
- Identification and avoidance / management of exacerbating factors and comorbidities
  - Full assessment for exacerbating factors including allergens, passive / active smoking, polyps
- Assessment of adherence and inhaler technique
  - Poor adherence and suboptimal inhaler technique are common in practice

Chung KF et al. Eur Respir J 2014;43:343–73

•**Disease-related comorbidities**

Rhinitis, rhinosinusitis +/- nasal polyposis (and, in children, *rhinoconjunctivitis*) are the most frequent comorbidities and are often associated with uncontrolled asthma.

•**Comorbidities contributing to symptoms or poor quality of life**

Obesity may cause exertional dyspnoea by reducing the functional residual capacity and expiratory reserve volume. It may be associated in adults, particularly women, with refractory asthma

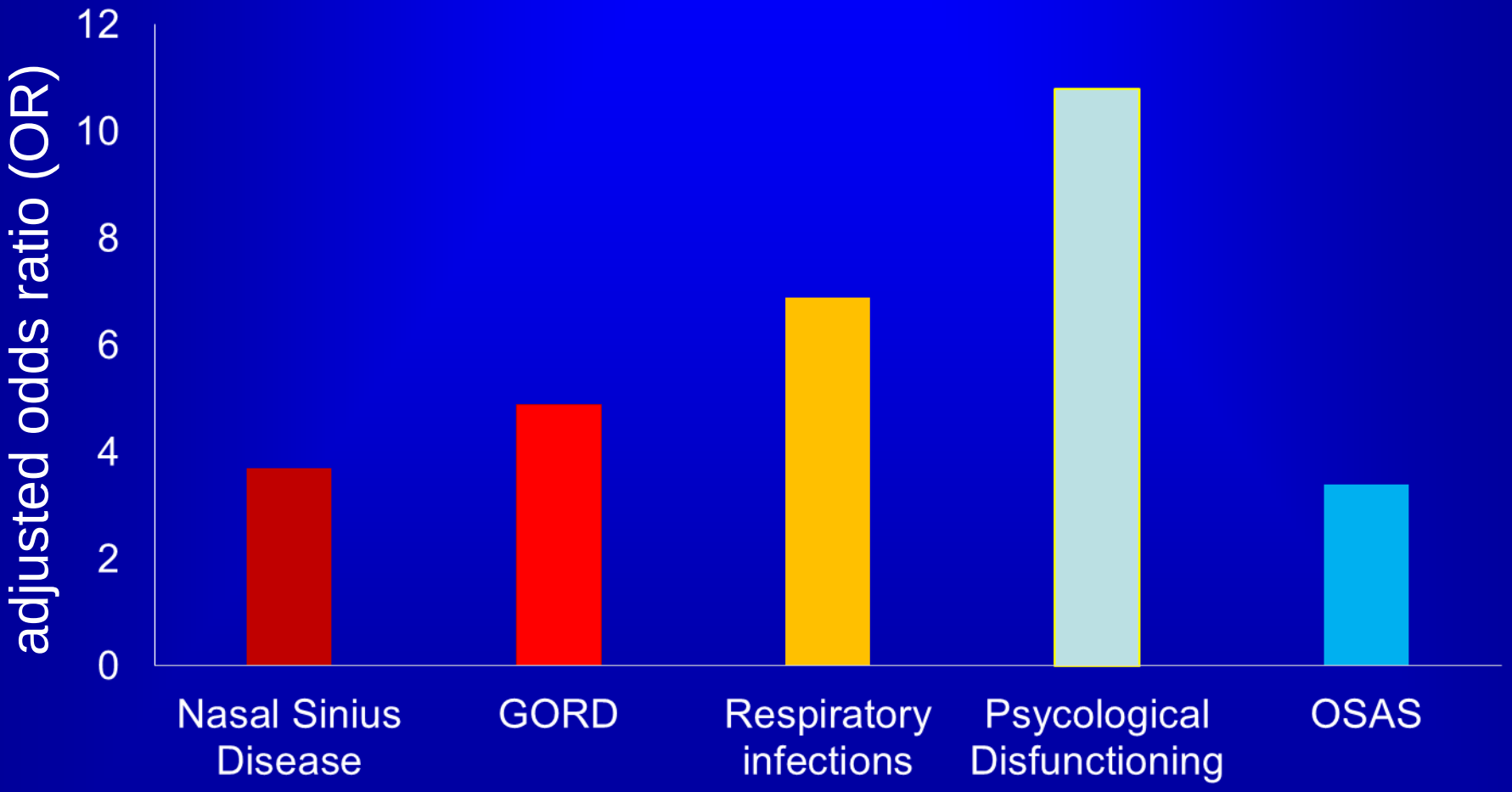
Obstructive sleep apnoea (OSA) is common among adults with asthma, particularly if severe.

Gastro-oesophageal reflux disease (GORD) is found in 25-80% of adults and children with asthma.

Asthma–COPD overlap is an interim term for adult patients with functional and clinical features of both asthma and COPD

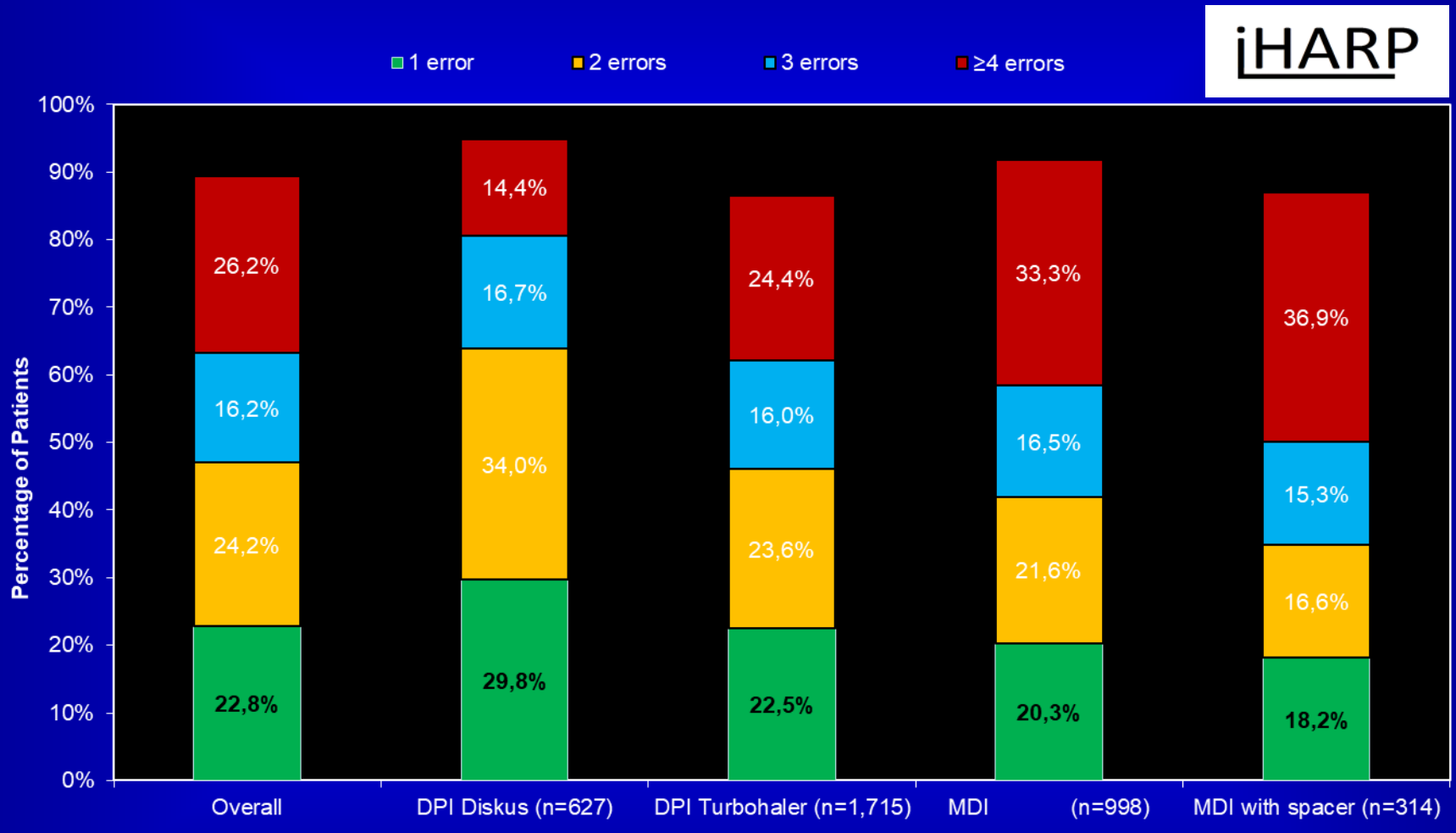
Mental disorders (e.g., anxiety, depression, panic attacks) are more common in asthma of any severity, and impact on quality of life. Psychological stress may contribute to poor adherence, greater airway inflammation and worse asthma control.

Exacerbations & difficult-to-treat asthma



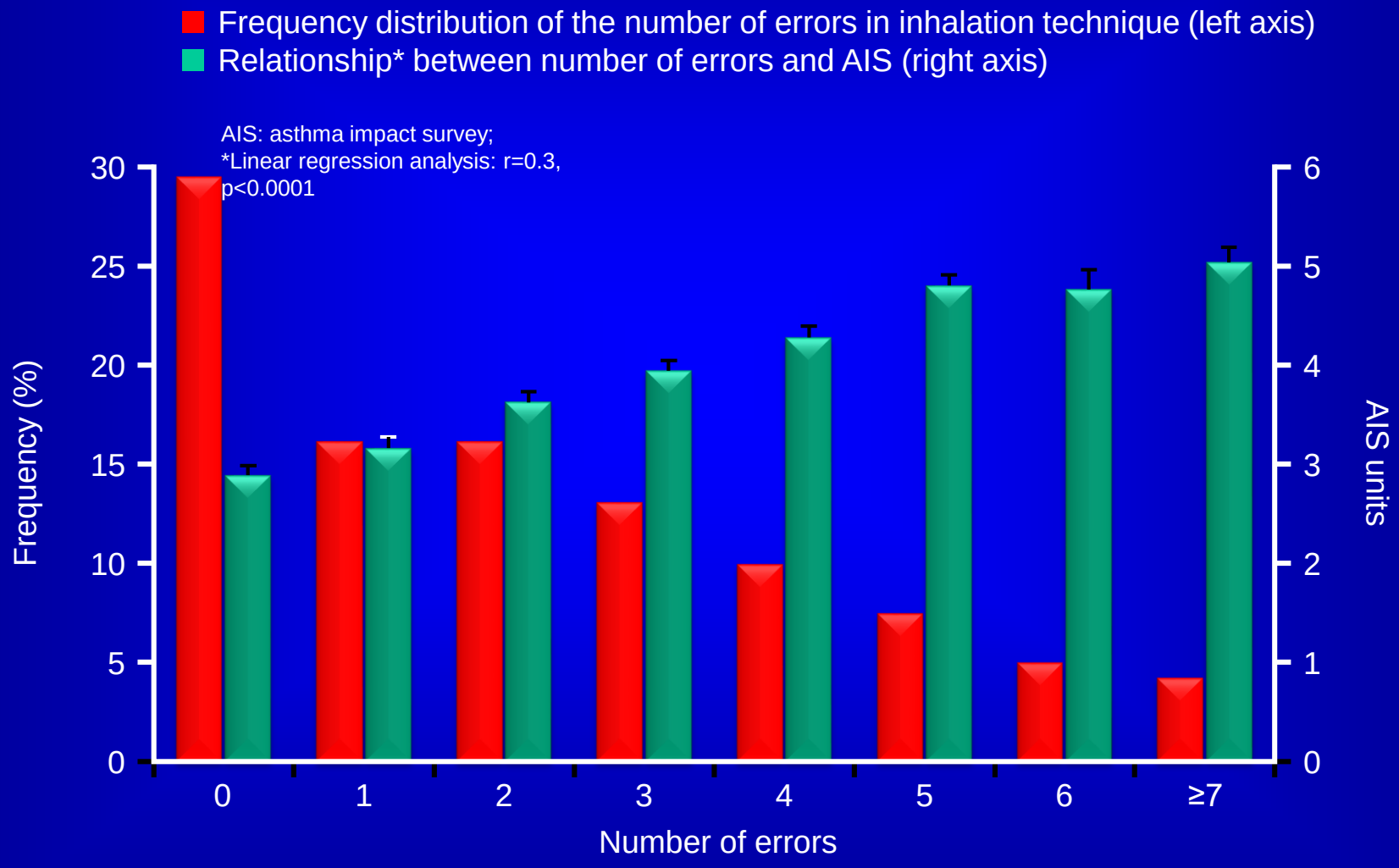
Ten Brinke at al, ERJ 2005

More than 90% Patients make ≥1 potentially serious inhaler error



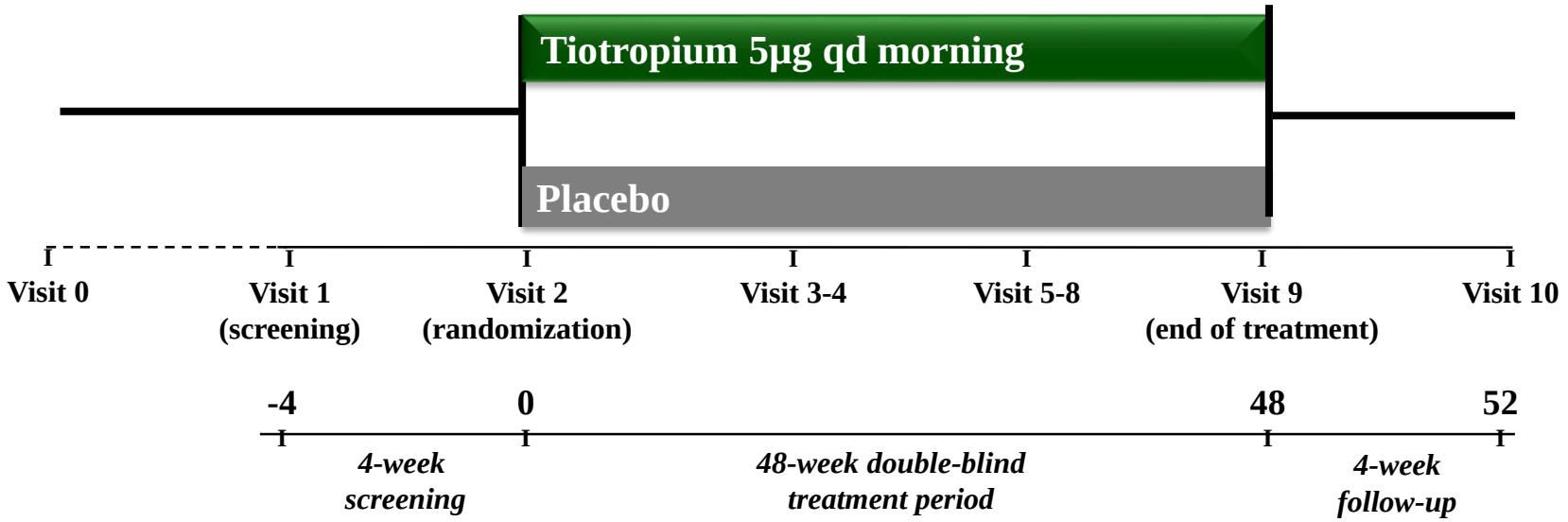
Price D, et al. 2014 Abstract presented IPCRG 2014

Inhaler handling errors are related to poorer asthma stability



V Giraud, Misuse of corticosteroid MDI is associated with Asthma Instability; ERS Journal: 2002

Study design: double-blind, randomized, placebo-controlled, parallel-group (two identical trials)



Three coprimary endpoints:

- FEV_1 peak (0-3 h) after 24 weeks
- FEV_1 trough after 24 weeks
- Time to first severe asthma exacerbation in pooled analysis after 48 weeks

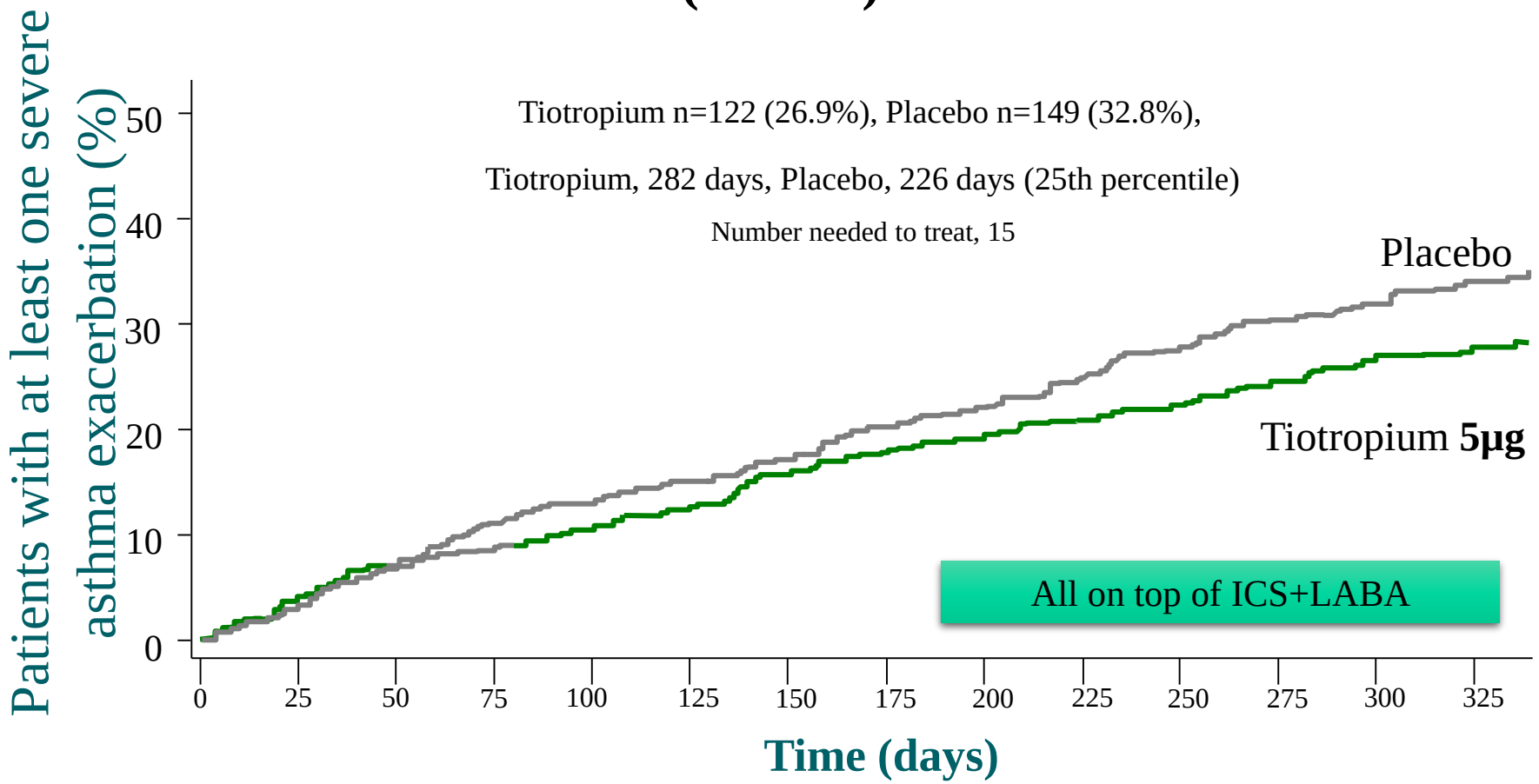
All patients at least on ICS maintenance therapy (≥800µg budesonide or equivalent/day)+LABA

117 centres, 5 continents

Kerstjens et al. *NEJM* 2012 online.
FEV_1, forced expiratory volume in 1 second; ICS, inhaled corticosteroid; LABA, long-acting β_2-agonist; qd, once daily

PrimoTinA-asthma™

HR=0.79; Risk reduction of 21% (*P*=0.03)



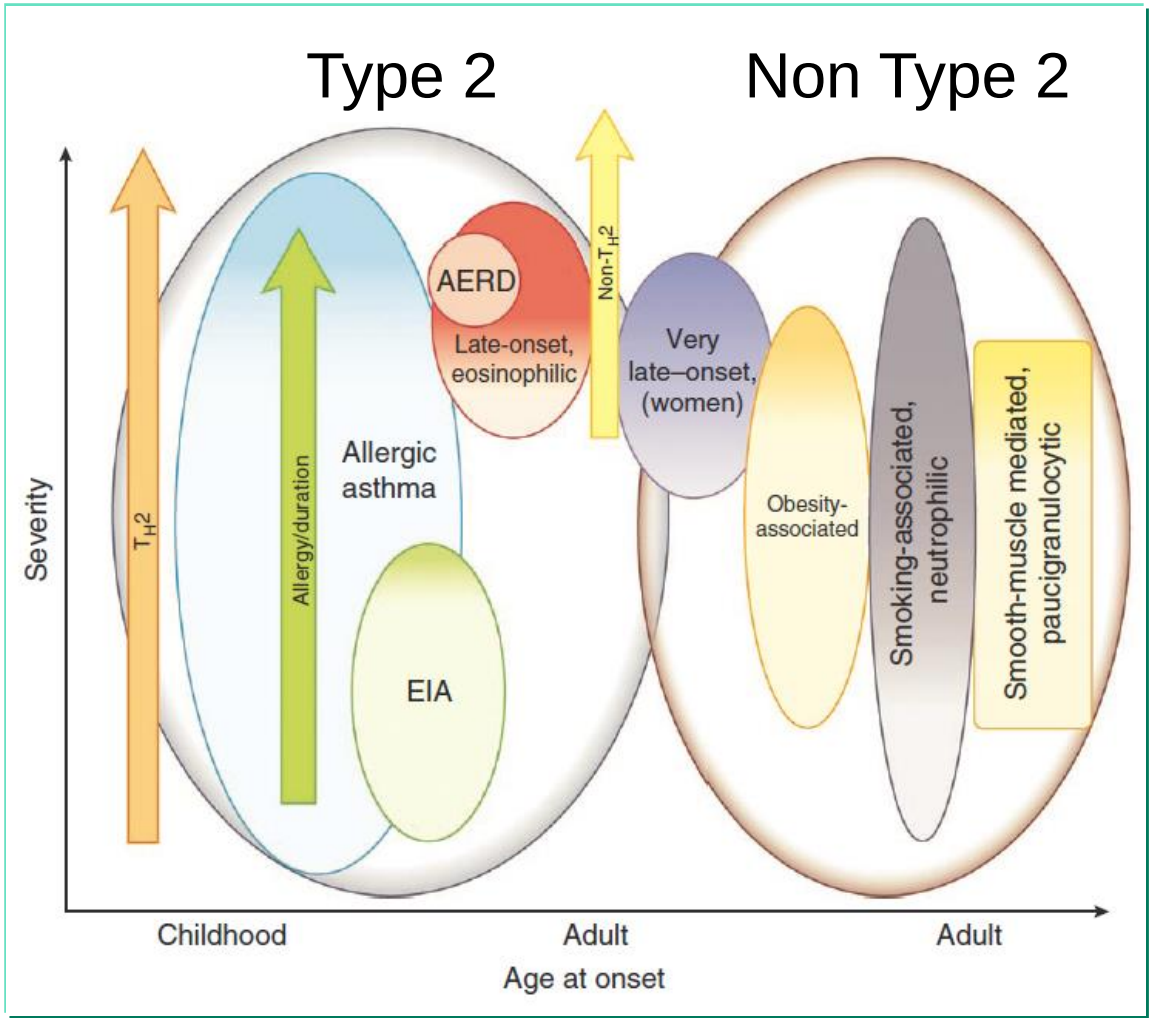
Patients at risk

Placebo	454	435	412	388	379	367	356	339	332	319	303	290	282	272
Tiotropium 5µg	453	430	409	401	389	378	363	353	348	339	331	319	308	298

Kerstjens et al. *NEJM* 2012 online.
HR, hazard ratio; ICS, inhaled corticosteroid; LABA, long-acting β_2-agonist

PrimoTinA-asthma™

THEORETICAL GROUPING OF EMERGING ASTHMA PHENOTYPES BASED ON THE DISTINCTION BETWEEN TH2-HIGH ASTHMA AND NON-TH2 ASTHMA



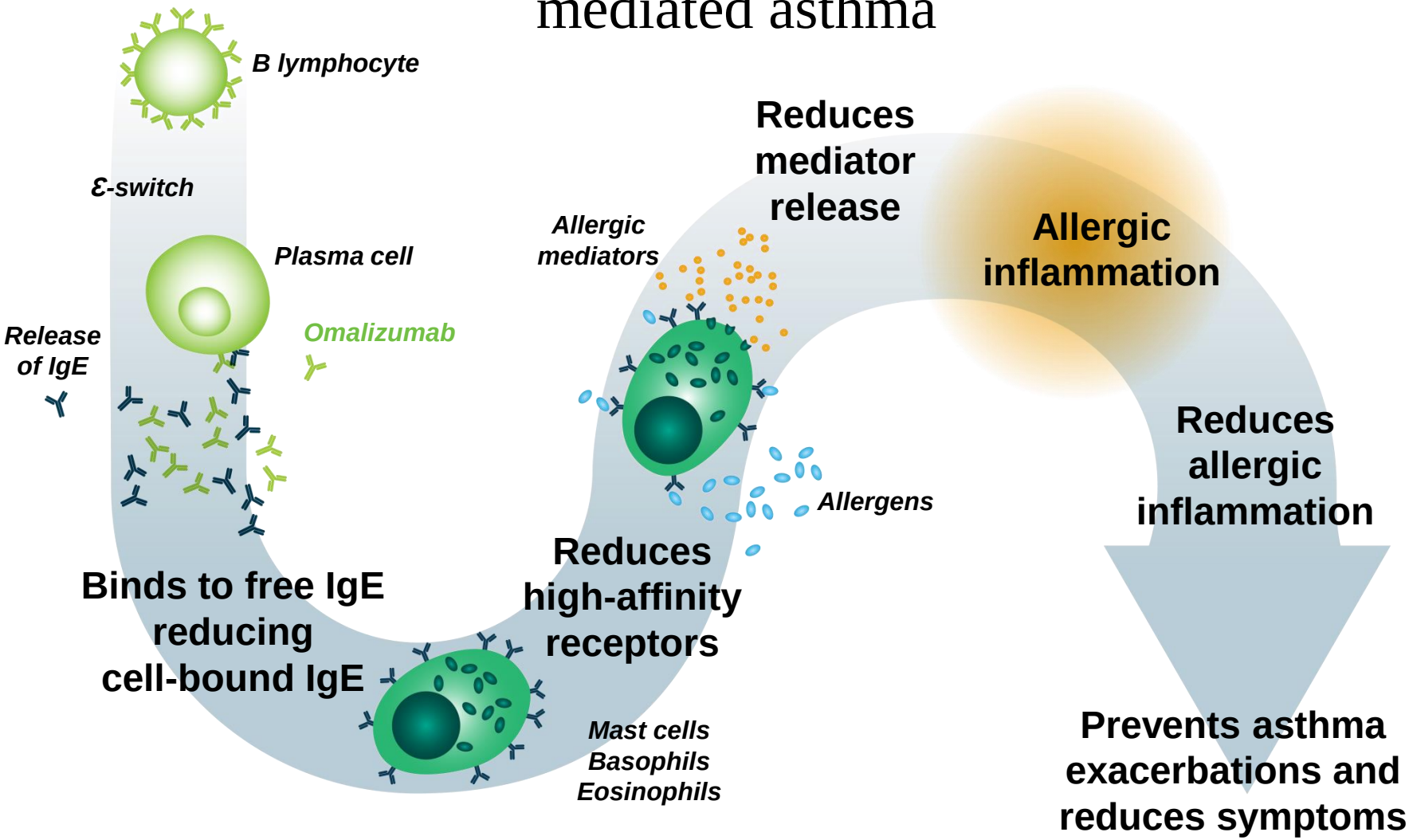
Wenzel S et al, Nat Med. 2012;18(5):716-25

Biologiocal Drugs in asthma treatment

Drug	Mechanism of action	Effects	Development*
Omalizumab	Binds free IgE	Reduces exacerbations, improves symptoms and quality of life	FDA- and EMA-approved
Mepolizumab	Blocks IL-5	Decreases the number of eosinophils and frequency of exacerbations, as well as prednisone consumption	Phase II/III
Reslizumab	Blocks IL-5	Decreases the number of sputum eosinophils and enhances FEV1	Phase II
Benralizumab	Inhibits binding of IL-5 to IL-5Rα	Depletes the number of peripheral blood eosinophils	Phase I/II
Pascolizumab	Blocks IL-4	No significant clinical efficacy	Phase II
Altrakincept	Soluble IL-4R	No significant clinical efficacy	Phase II
Pitrakinra	Inhibits binding of IL-4 and/or IL-13 to IL-4Rα	May prevent a decrease in FEV1 after allergen challenge	Phase II
Tralokinumab	Blocks IL-13	Reduces airway eosinophilia	Phase I/II
Anrukinzumab	Blocks IL-13	Inhibits allergen-induced late-phase asthmatic responses	Phase II
Lebrikizumab	Blocks IL-13	Enhances FEV1 in patients with high serum levels of periostin	Phase II
MEDI-528	Blocks IL-9	Reduces airway inflammation and hyper-responsiveness in mice	Phase II
MT203	Blocks GM-CSF	Decreases survival and activation of eosinophils	Phase II
Secukinumab	Blocks IL-17	Data not yet available	Phase II; NCT01478360
Golimumab	Blocks TNFα	May increase the risk of infections and malignancies	Suspended
Infliximab	Blocks TNFα	Reduces PEF oscillations and asthma exacerbations	Phase II
Etanercept	Soluble TNFα receptor	Conflicting data; see main text	Phase II

Pelaia G, Nature Drug Discovery 2012

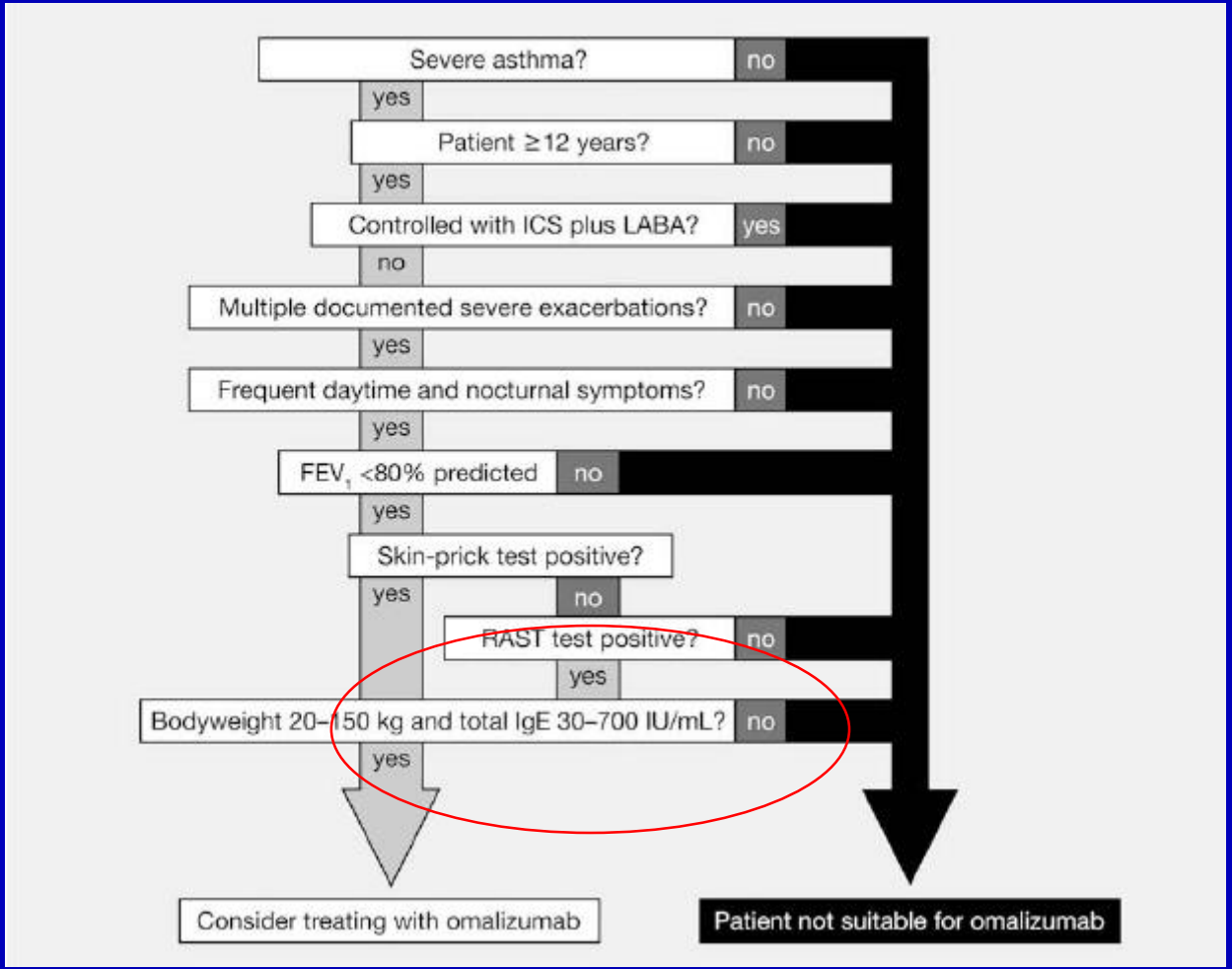
Omalizumab prevents the allergic cascade in IgE-mediated asthma



FDA. Pulmonary–Allergy Drugs Advisory Committee Meeting. 2003. XOLAIR™ (Omalizumab).
Available at: http://www.fda.gov/ohrms/dockets/ac/03/briefing/3952B1_01_Genentech-Xolair.htm. Accessed May 2015.

The Wave of Personalized Medicine in asthma

"Biomarker-Driven Therapy Is Ready for the Clinic"



The use of Omalizumab in the treatment of severe allergic asthma.
Holgate ST, Resp Med 2009

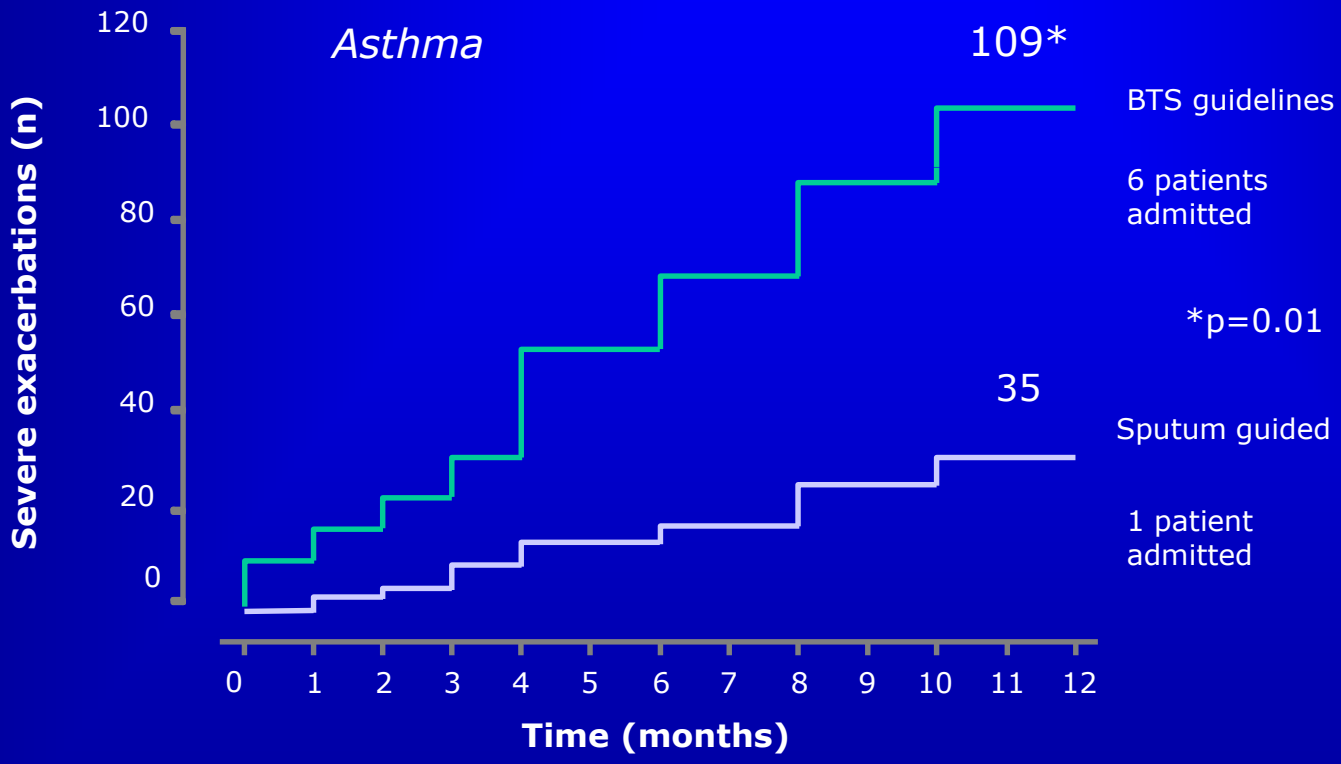
Therapeutic antibodies entered clinical development

- Cytokines released by immune-inflammatory and airway structural cells contribute to asthma inflammation[1]
- Research has identified several potential cytokine targets for anti-asthma therapy[2–4]

Therapeutic antibody	Target		Therapeutic antibody	Target
Infliximab	TNF-α		Mepolizumab	IL-5
Golimumab	TNF-α		Benralizumab	IL-5R
Etanercept	TNF-α		Reslizumab	IL-5
Daclizumab	IL-2R (CD25)		QAX576[4]	IL-13
Secukinumab	IL-17A		Tralokinumab	IL-13
Brodalumab	IL-17		Lebrikizumab	IL-13
			Dupilumab[4]	IL-4R/IL-13R

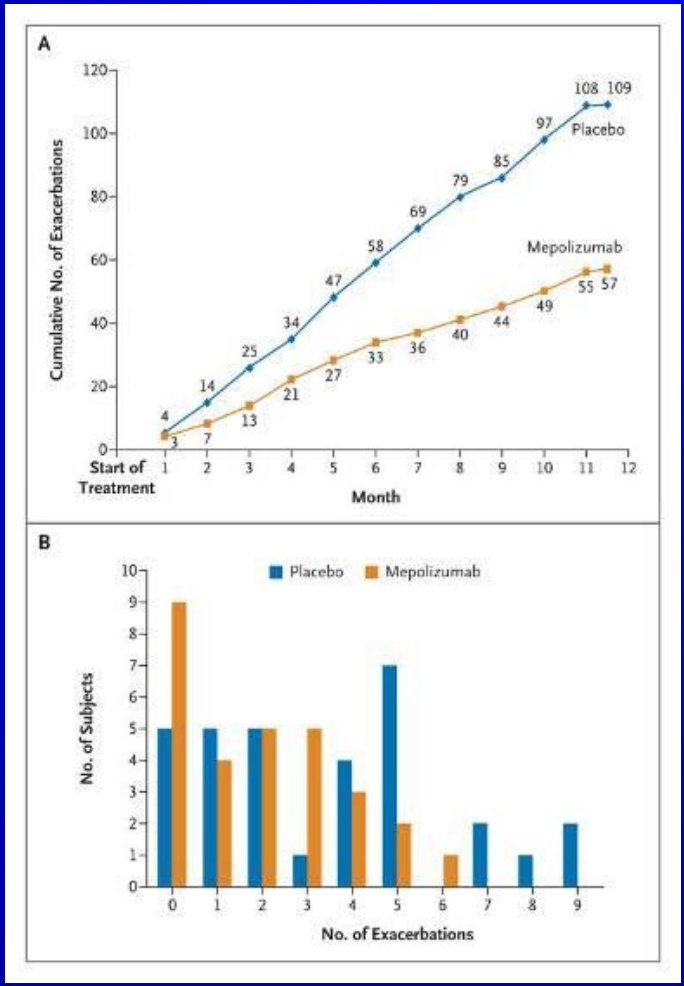
1. Lambrecht BN & Hammad H. *Nat Immunol* 2015; 16:45–56; 2. Gallelli L, *et al*. *Biomed Res Int* 2013; 2013:104315;
3. Menzella F, *et al*. *Multidiscip Respir Med* 2015;10:1; 4. https://clinicaltrials.gov/ct2/home.

Targeting sputum eosinophilia and severe exacerbations of asthma

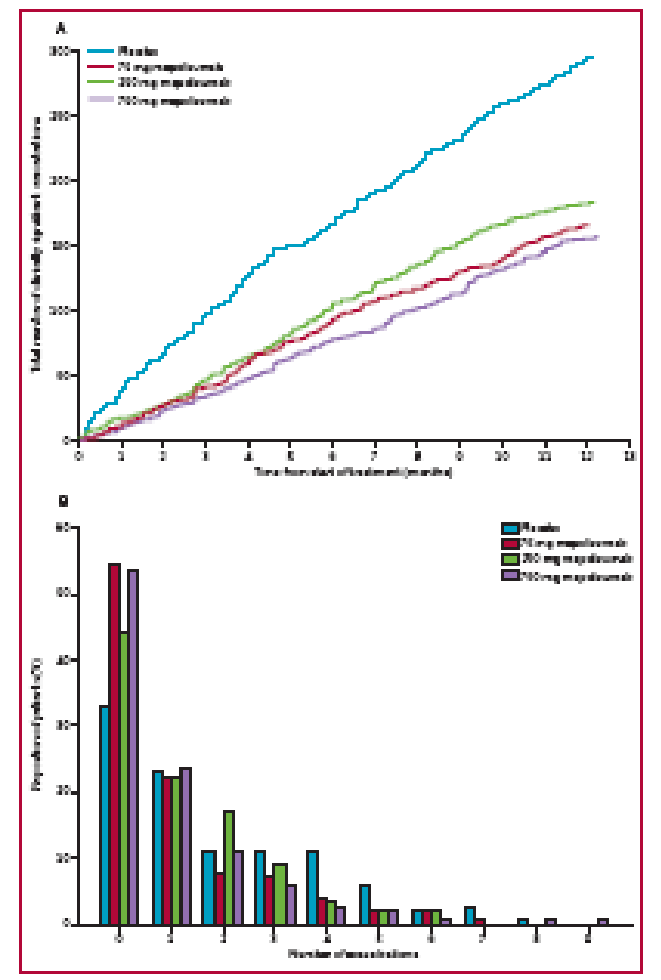


Green et al, Lancet 2002; 360: 1715-21

Mepolizumab: effect on severe exacerbations

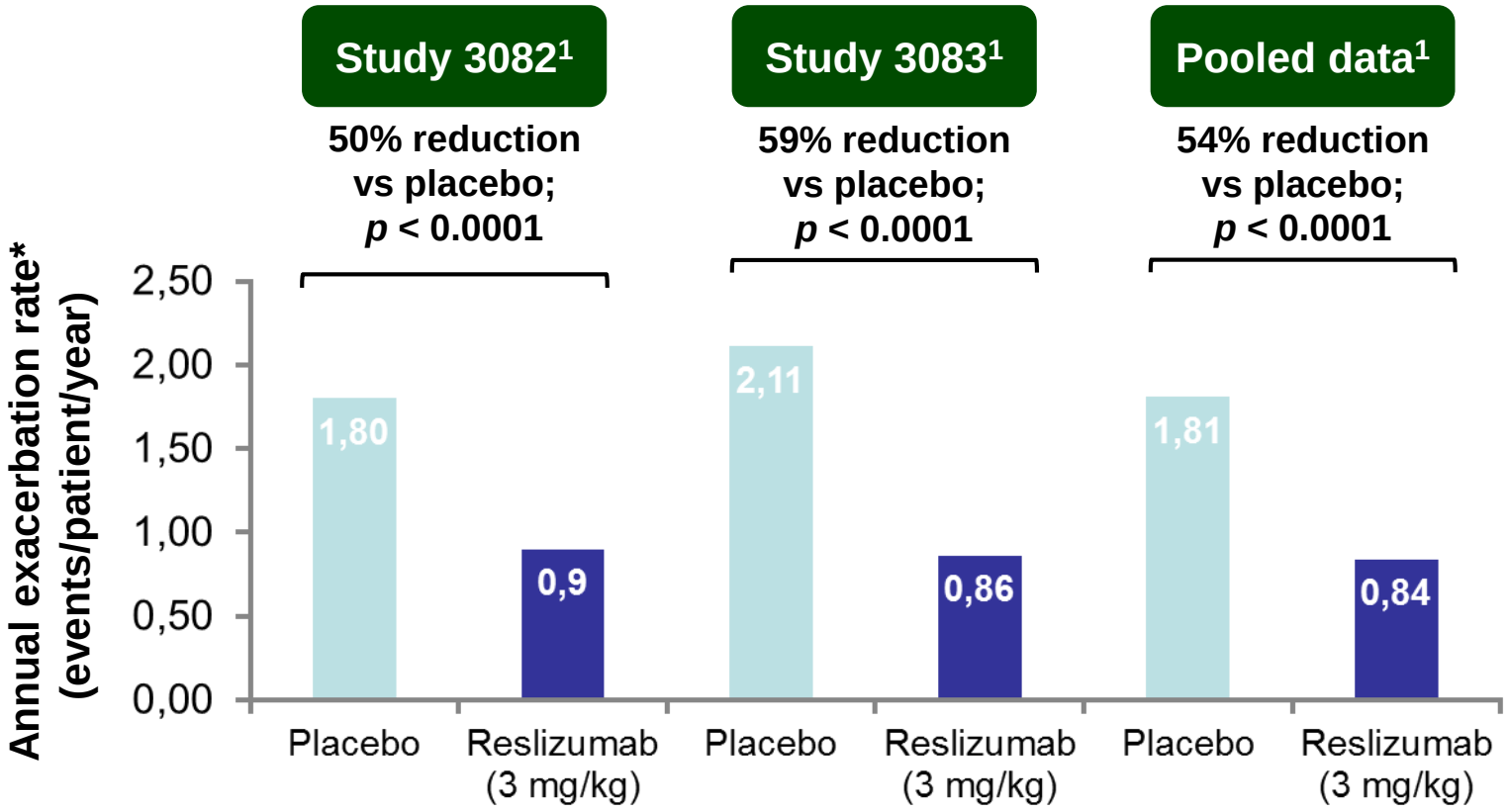


Haldar et al. NEJM 2009;360:973-84



Pavord et al. Lancet 2012;380:651-9.

Studies 3082 and 3083: Reslizumab consistently reduced clinical exacerbation rates compared with placebo



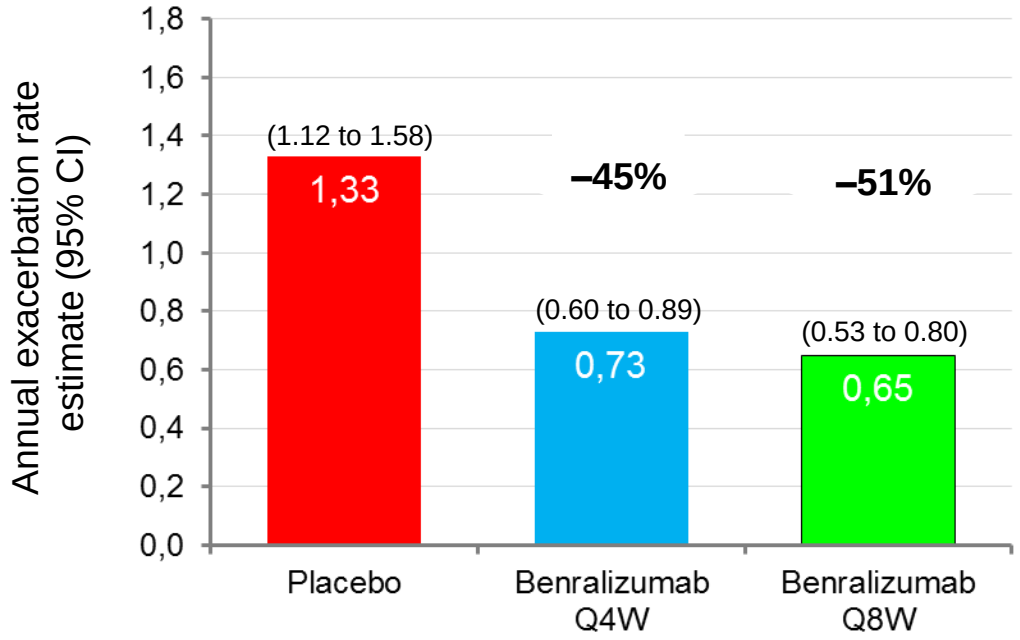
Reslizumab significantly reduced the annual exacerbation rate in patients with inadequately controlled asthma and active eosinophilic airway inflammation[1]

* Exacerbations were defined as worsening asthma resulting in any of the following: use of systemic corticosteroids in steroid-naïve patients, a two-fold increase in the dose of either ICS or systemic corticosteroids for ≥ 3 days, the need for asthma-related emergency treatment.

1. Castro M, *et al*. *Lancet Respir Med* 2015; 3:355–366.

Annual asthma exacerbation rate reduction with benralizumab

Blood eosinophils ≥300 cells/μL[a]



Annual exacerbation rate ratio vs. placebo[b]

Q4W
0.55 (0.42 to 0.71)
p<0.0001

Q8W
0.49 (0.37 to 0.64)
p<0.0001

[a]Adolescents represented 4%, 3%, and 4% of the placebo, Q4W, and Q8W cohorts, respectively.
[b]Estimates calculated by a negative binomial model with adjustment for treatment, region, oral corticosteroid use, and prior exacerbations.
95% CI: confidence interval.

Profile: Anti-IL 5 treatments

- The magnitude of benefit for exacerbation reduction is greater in individuals with a higher number of exacerbations in the previous year and higher blood eosinophil counts. However, improvements, especially in symptoms, remain slight.
- Mepolizumab and Benralizumab also enabled prednisolone-dependent people with asthma to successfully withdraw oral corticosteroid
- treatment.
- Antiinterleukin- 5 receptor strategies have successfully identified a target group, patients with eosinophilic inflammation, and an important outcome, exacerbation reduction.
- Phase 3 trials demonstrated similar reductions in exacerbation frequency with modest effects on lung function and asthma control..

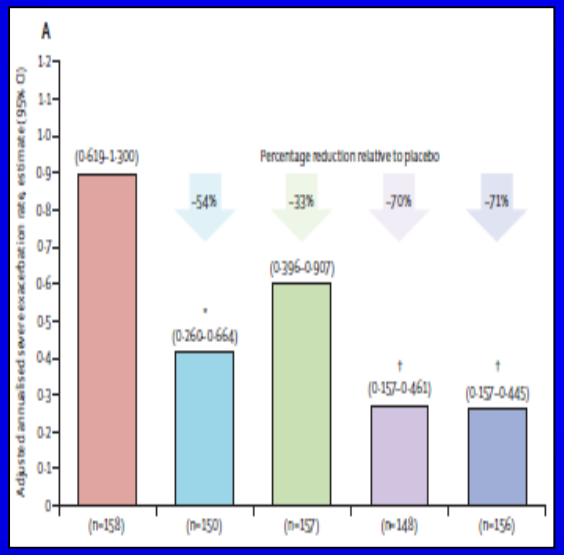
ADJUSTED ANNUALISED SEVERE EXACERBATION EVENT RATES ESTIMATED FROM THE 24-WEEK TREATMENT PERIOD

769 severe asthmatics not controlled by inhaled LABA/highICS

Treated with dupilumab 200-300 mg sc every 2 or 4 weeks for 12 months

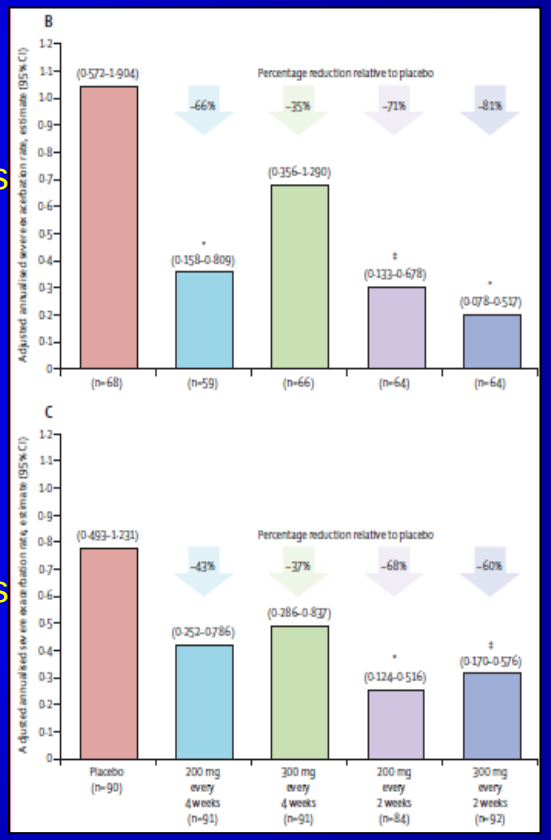
Powered on FEV1

Dupilumab improves lung functions and reduces severe exacerbations irrespective of baseline eosinophil count



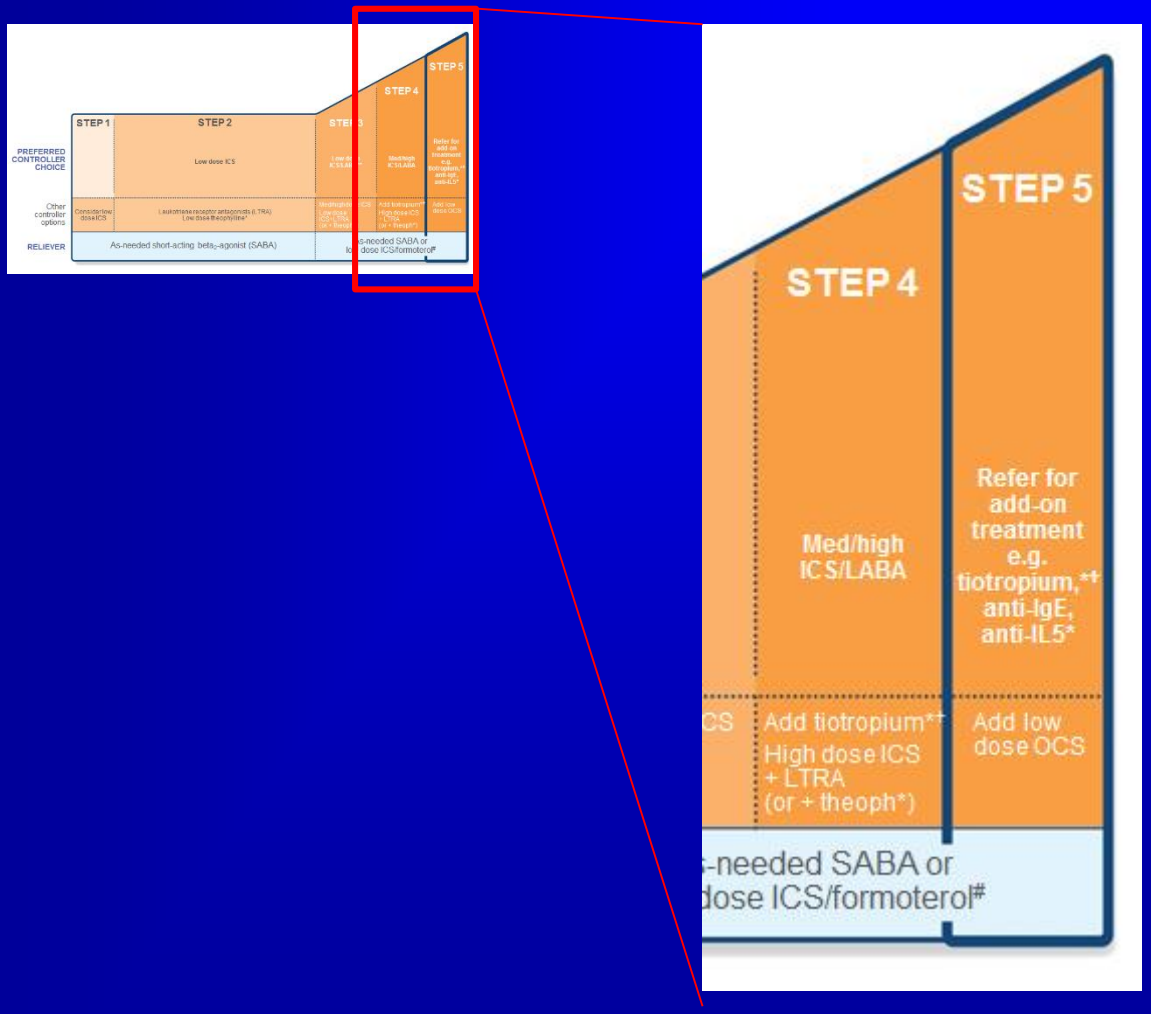
Blood Eos >300/uL

Blood Eos <300/uL



Wenzel S et al., Lancet. 2016 Apr 26

Impact on the treatment pathway «TYPE 2»



Fevipiprant – CRTH2 antag

Before any mABs?

Intermittent: viral – seasonal?

Dupilumab

Not only exacerbations

High + low eos?

Comorbidities

Tralokinumab ?

High Periostin/DPP4?

Anti TSLP ?

Intremittent - seasonal

Azithromycin?

Treatment for the poor?

Definition and terminology

- A flare-up or exacerbation is an acute or sub-acute worsening of symptoms and lung function compared with the patient's usual status
- Terminology
  - 'Flare-up' is the preferred term for discussion with patients
  - 'Exacerbation' is a difficult term for patients
  - 'Attack' has highly variable meanings for patients and clinicians
  - 'Episode' does not convey clinical urgency
- Consider management of worsening asthma as a continuum
  - Self-management with a written asthma action plan
  - Management in primary care
  - Management in the emergency department and hospital
  - Follow-up after any exacerbation

Identify patients at risk of asthma-related death

- Patients at increased risk of asthma-related death should be identified
  - Any history of near-fatal asthma requiring intubation and ventilation
  - Hospitalization or emergency care for asthma in last 12 months
  - Not currently using ICS, or poor adherence with ICS
  - Currently using or recently stopped using OCS
    - (indicating the severity of recent events)
  - Over-use of SABAs, especially if more than 1 canister/month
  - Lack of a written asthma action plan
  - History of psychiatric disease or psychosocial problems
  - Confirmed food allergy in a patient with asthma
- Flag these patients for more frequent review

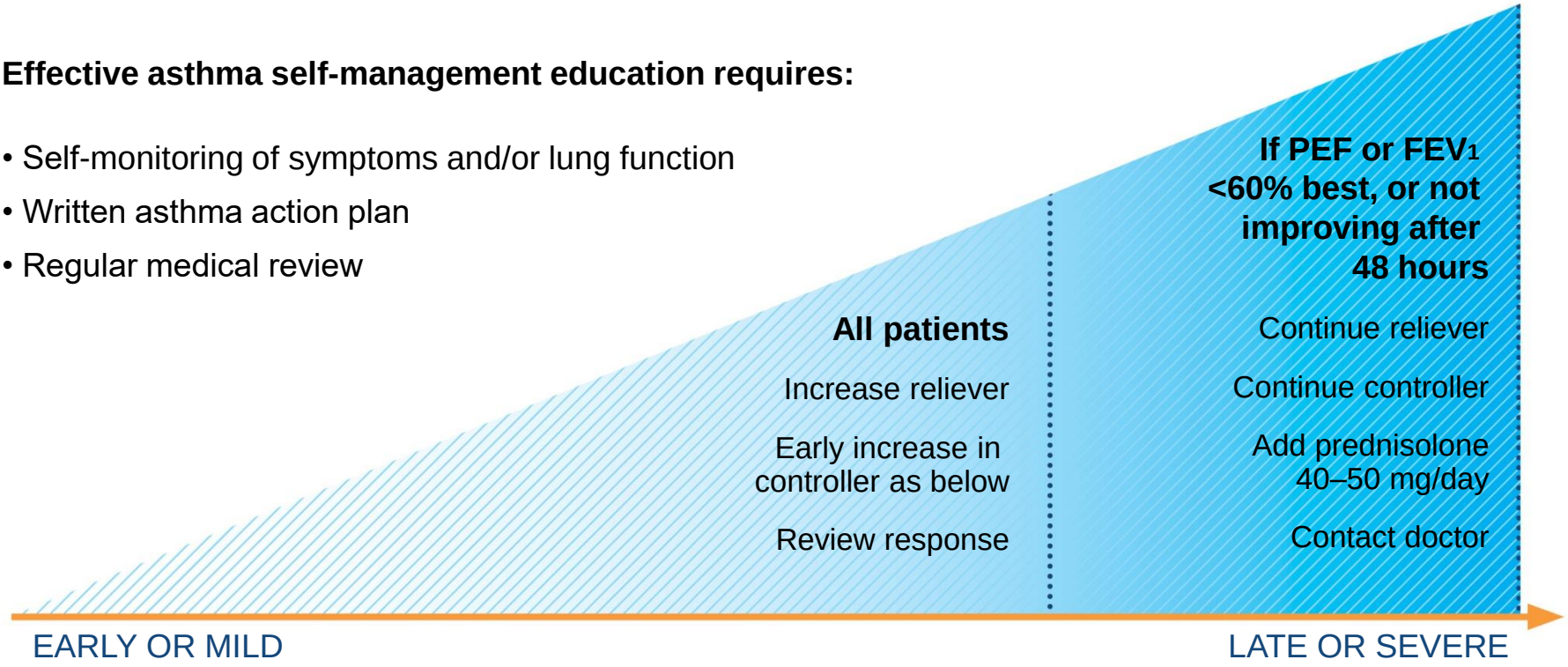
Written asthma action plans

- All patients should have a written asthma action plan
  - The aim is to show the patient how to recognize and respond to worsening asthma
  - It should be individualized for the patient's medications, level of asthma control and health literacy
  - Based on symptoms and/or PEF (children: only symptoms)
- The action plan should include:
  - The patient's usual asthma medications
  - When/how to increase reliever and controller or start OCS
  - How to access medical care if symptoms fail to respond
- Why?
  - When combined with self-monitoring and regular medical review, action plans are highly effective in reducing asthma mortality and morbidity

Written asthma action plans

Effective asthma self-management education requires:

- Self-monitoring of symptoms and/or lung function
- Written asthma action plan
- Regular medical review



Management of asthma exacerbations in primary care

1 - Reasess diagnosis: Asthma? (see clinical presentation)
2 - Check for risk factors for asthma related death
(see clinical assessment of asthma exacerbations)

3 - Triage

		prefers sitting to lying NOT AGITATED	sits hunched forward AGITATED	sits hunched forward DROWSY/CONFUSED
POSITION				
SPEECH		phrases	words	confused
RESP. RATE		< 30	> 30	> 30
HEART RATE		100-120	> 120	> 120
O_2 SATURATION		≥ 90%	< 90%	< 90%
AUSCULTATION		wheeze	wheeze	silent chest
PEF		> 50% pred or best	≤ 50% pred or best	-
		MILD MODERATE	SEVERE	LIFE THREATENING

START TREATMENT
- **SABA** 4-10 puffs (pMDI+spacer)
  Every 20 min for 1h
- **Prednisolone:** Adults 1 mg/Kg, max 50 mg, child 1-2 mg/Kg, max 40 mg
- O2: target SO2 93-95% (child. 94-98%)

TRANFER urgently to ACUTE CARE FACILITY
Start treatment while waiting:
- **SABAs+ipratropium bromide**
- **O2**
- **Systemic corticosteroid**

REVIEW FREQUENTLY. MEASURE LUNG FUNCTION AFTER 1 HOUR.

		IMPROVED	NOT IMPROVED OR WORSENING
SYMPTOMS	WHEEZE		
O_2 SATURATION		> 94% ROOM AIR	≤ 94% ROOM AIR
PEF		IMPROVING AND >60-80% PRED. OR PERSONAL BEST	NOT IMPROVING AND <60-80% PRED. / PERSONAL BEST
HOME RESOURCES		ADEQUATE	INADEQUATE

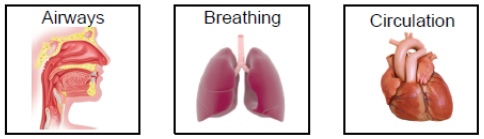
Arrange at discharge

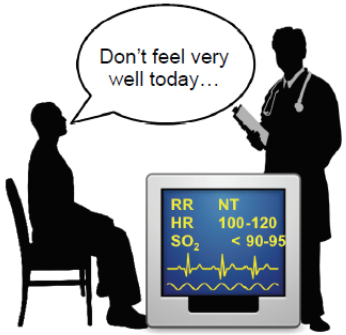
Reliever as needed. Instruct about tapering SABA
Controller start or step up; check technique+adherence
Prednisolone continue for 5-7 days (child 3-5)
Give interim action plan
Follow up within 2-7 days

Exacerbation management in acute care facility, e.g. emergency department

Is it asthma?

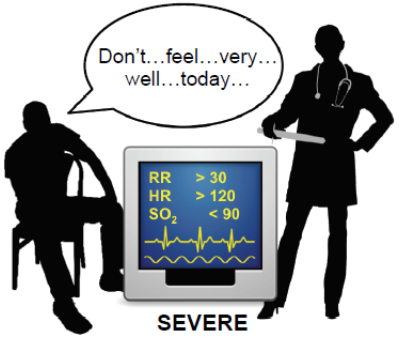
Vital function assessment and clinical assessment





MILD/MODERATE

SABAs
Consider Ipratropium bromide
Controlled O2 to maintain SO2 93-95% (Child. 94-98%)
Oral CS



SEVERE

SABAs
Ipratropium bromide
Controlled O2 to maintain SO2 93-95% (Child. 94-98%)
Oral or IV CS
Consider IV magnesium
Consider high dose ICS

LIFE THREATENING

Call ICU
Start SABA and O2
Prepare for intubation

REVIEW FREQUENTLY. MEASURE LUNG FUNCTION AFTER 1 HOUR.

SYMPTOMS (WHEEZE)	IMPROVED	NOT IMPROVED	DETERIORATING
SPIROMETRY or PEF	60-80% PRED. OR PERSONAL BEST	< 60% PRED. OR PERSONAL BEST	DETERIORATING

Consider discharge

Arrange at discharge

Reliever as needed. Instruct about tapering SABA
Controller start or step up; check technique+adherence
Prednisolone continue for 5-7 days (child 3-5)
Give interim action plan
Follow up within 2-7 days

Continue treatment and reassess frequently
Consider need for admission