Better Air Quality 2006, 13-15 December, Yogyakarta, Indonesia

New WHO Air Quality Guidelines:
their relevance for setting and implementing ambient AQ standards in Asia

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The process of AQG Update, 2005

Oct – Nov 2004: Steering Group established;

January 2005: Steering Group: update scope & structure;
recommendation of authors of background material;

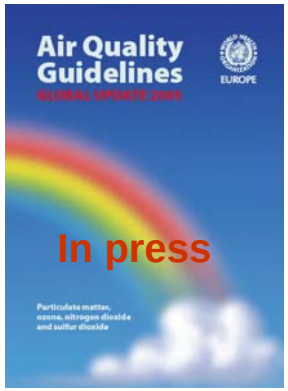
July – Sept 2005: review of the 1st draft;

18-20 October 2005: WG meeting, Bonn;

Dec 2005 – June 2006: finalization of background materials;

5 October 2006 – formal announcement of AQG

WHO editing / printing ⇒ publication



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Air Quality Guidelines: contents part 1

Chapter	Title	Authors
Part 1. Application of AQG for policy development and risk reduction		
1	Sources of air pollution	R. Harrison (UK)
2	Air pollution levels	B. Sivertsen (Norway)
3	Human exposure to air pollution	N. Janssen (The Netherlands), S. Mehta (US)
4	Health effects of air pollution	N. Gouveia (Brazil), M. Maisonet (PAHO/Chile)
5	Determinants of susceptibility	M. Utell (US), M. Frampton (US)
6	Environmental equity	P. Kinney (US), MS O'Neill (US)
7	Health impact assessment	B. Ostro (US)
8	Applications of guidelines in policy formulation	A. Fernandez (Mexico), M. Zuk (Mexico)
9	Indoor air quality: special issues in risk assessment and management	K. Balakrishnan (India), NG Bruce (UK)

Air Quality Guidelines: contents part 2

Chapter	Title	Authors
Part 2. Risk assessment of selected pollutants		
10	Particulate matter	J. Samet (US), M. Brauer (Canada) R.Schlesinger (US)
11	Ozone	P. Saldiva (Brazil), N. Künzli (US / Switzerland)
12	Nitrogen dioxide	F. Forastiere (Italy), A. Peters (Germany) F. Kelly (UK), ST Holgate (UK)
13	Sulfur dioxide	M. Lippmann (US), K. Ito (US)

Scientific Advisory Group:

RH Anderson (UK), B. Brunekreef (The Netherlands), B. Chen (China), A. Cohen (USA)
R. Maynard (UK), I. Romieu (Mexico), KR. Smith (USA), S. Wangwongwatana (Thailand)

WHO AQG Update 2005: Main Results

- **Guideline values for PM, ozone, NO2 and SO2:**
  - the possibility of adverse effects remains, even if the guideline value is achieved;
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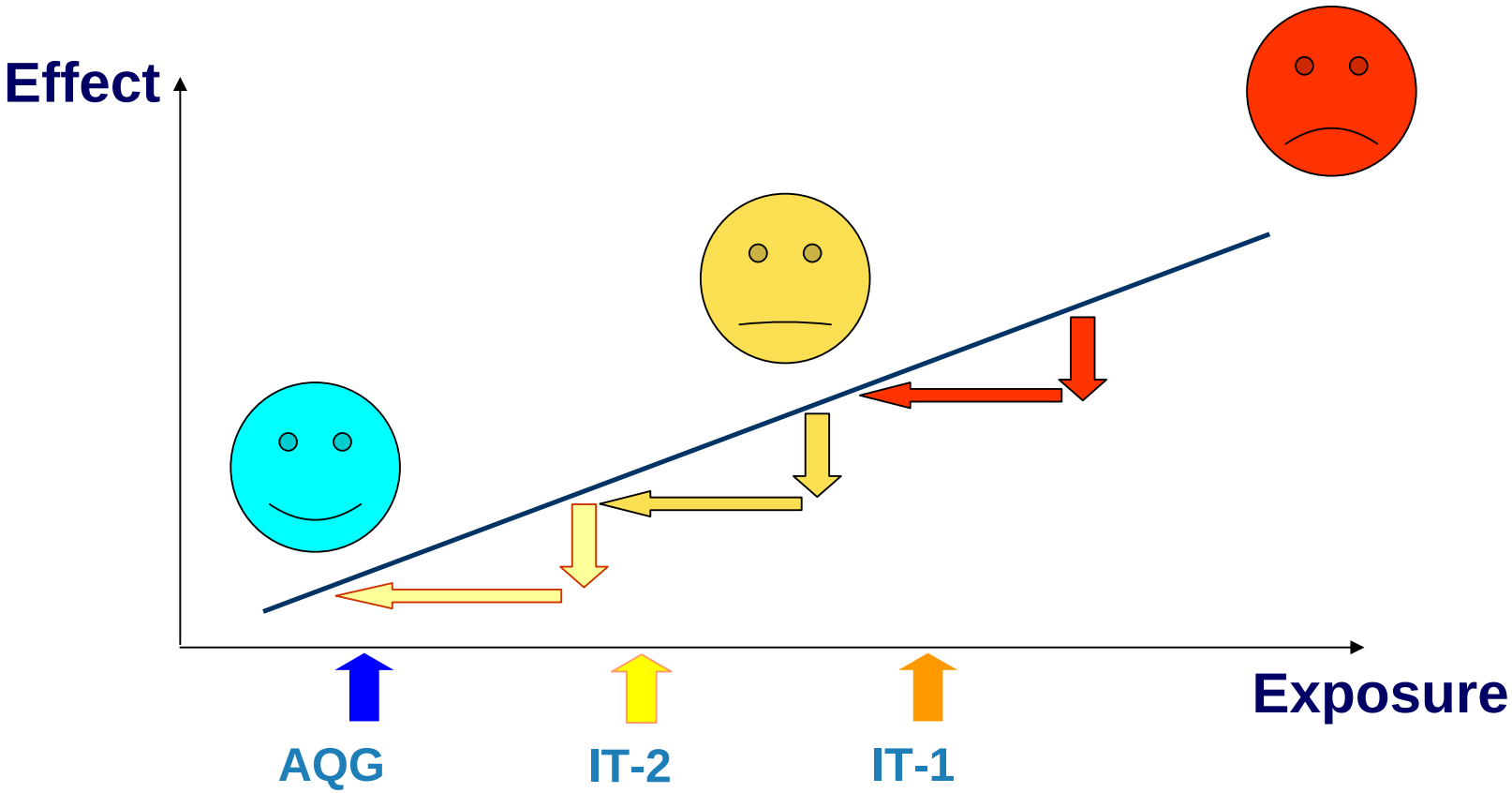
- **Guideline values for PM, ozone, NO2 and SO2:**
  - the possibility of adverse effects remains, even if the guideline value is achieved;
  - some countries might select even lower concentrations for their standards.

- **Interim targets for each pollutant:**
  - define steps in a progressive reduction of air pollution in more polluted areas;
  - promote a shift from concentrations with acute, serious health consequences to concentrations that, if achieved, would result in significant reductions in risks for acute and chronic effects.

Reduce the exposure to cut the health effect



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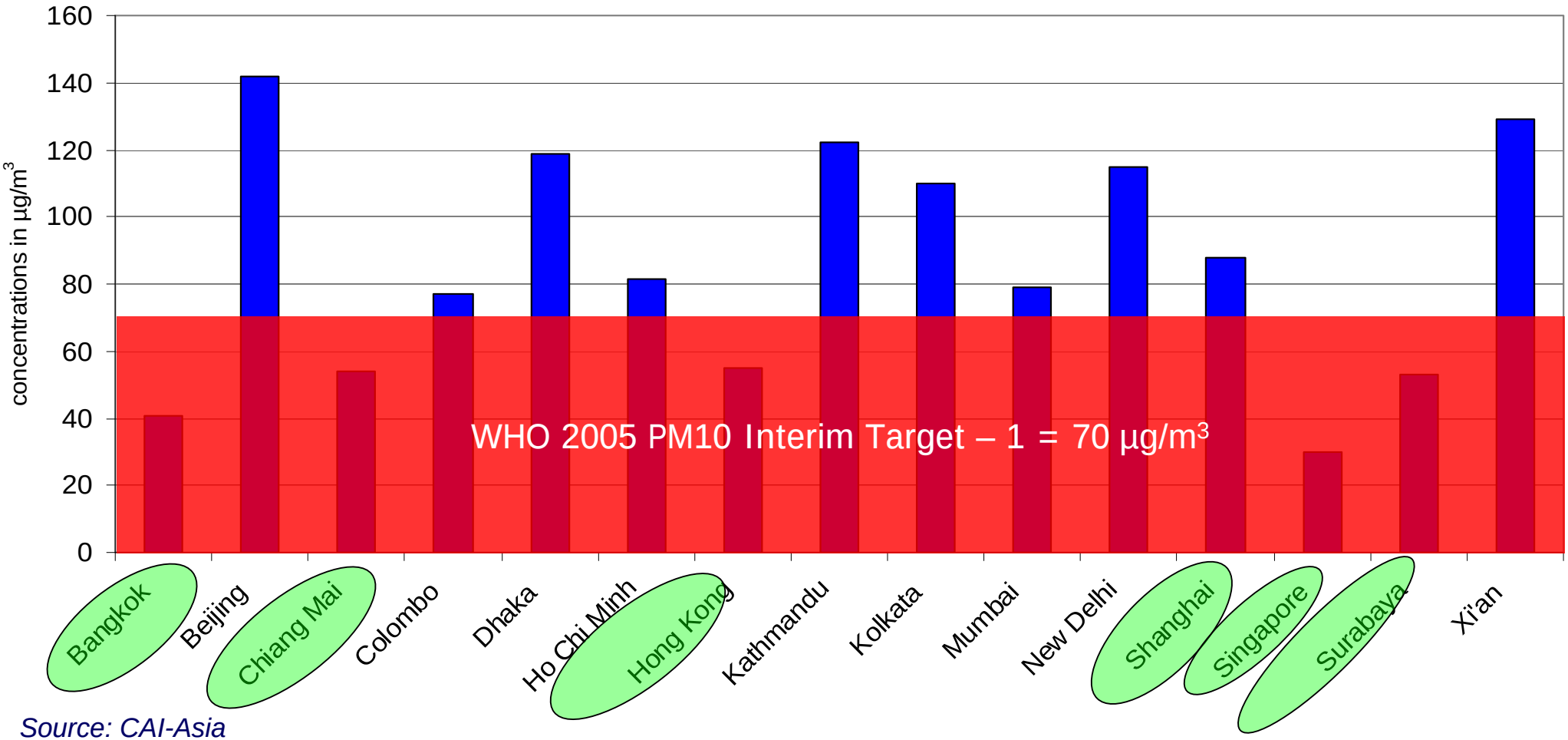
WHO AQG for particulate matter (1 of 2)

Annual mean level	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	Basis for the selected level
Interim target-1 (IT-1)	70	35	Levels associated with about 15% higher long-term mortality than at AQG
Interim target-2 (IT-2)	50	25	Risk of premature mortality decreased by approximately 6% compared to IT1
Interim target-3 (IT-3)	30	15	Mortality risk reduced by approximately 6% compared to IT2 levels.
Air quality guideline (AQG)	**20**	**10**	**Lowest levels at which total, CP and LCA mortality have been shown to increase (Pope et al., 2002). The use of $PM_{2.5}$ guideline is preferred.**

PM10 IT-1: challenge to some cities in Asia



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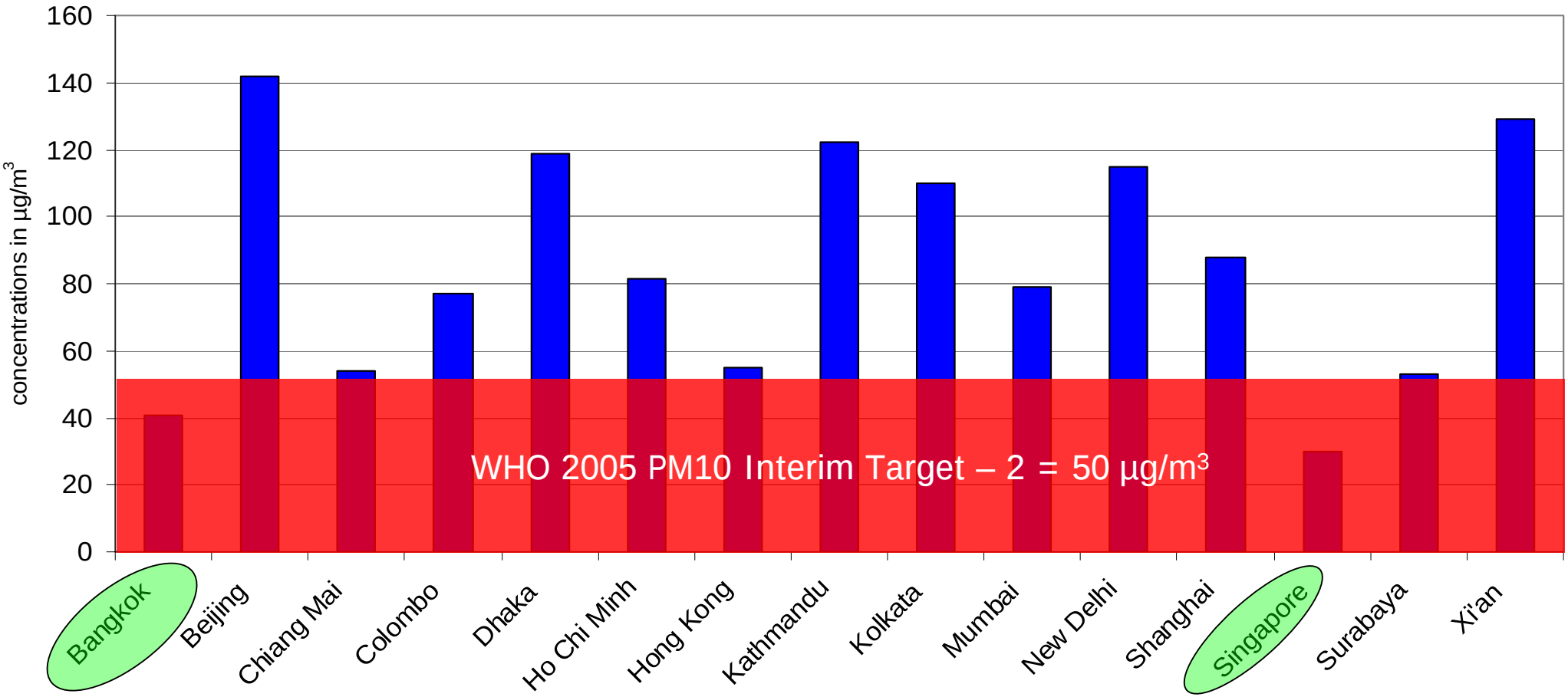
PM10 IT-2: challenge to most cities in Asia



Source: CAI-Asia

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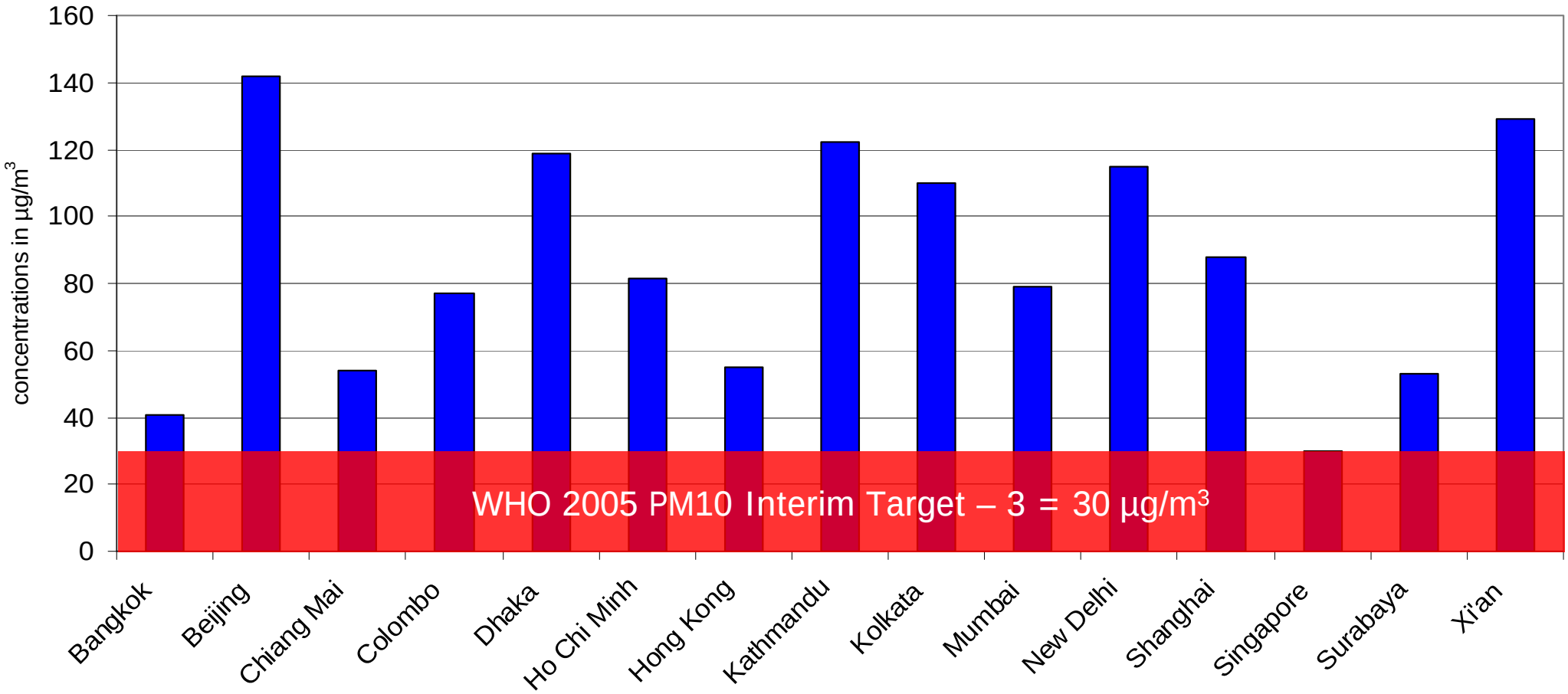
PM10 IT-3: challenge to all cities in Asia



Source: CAI-Asia

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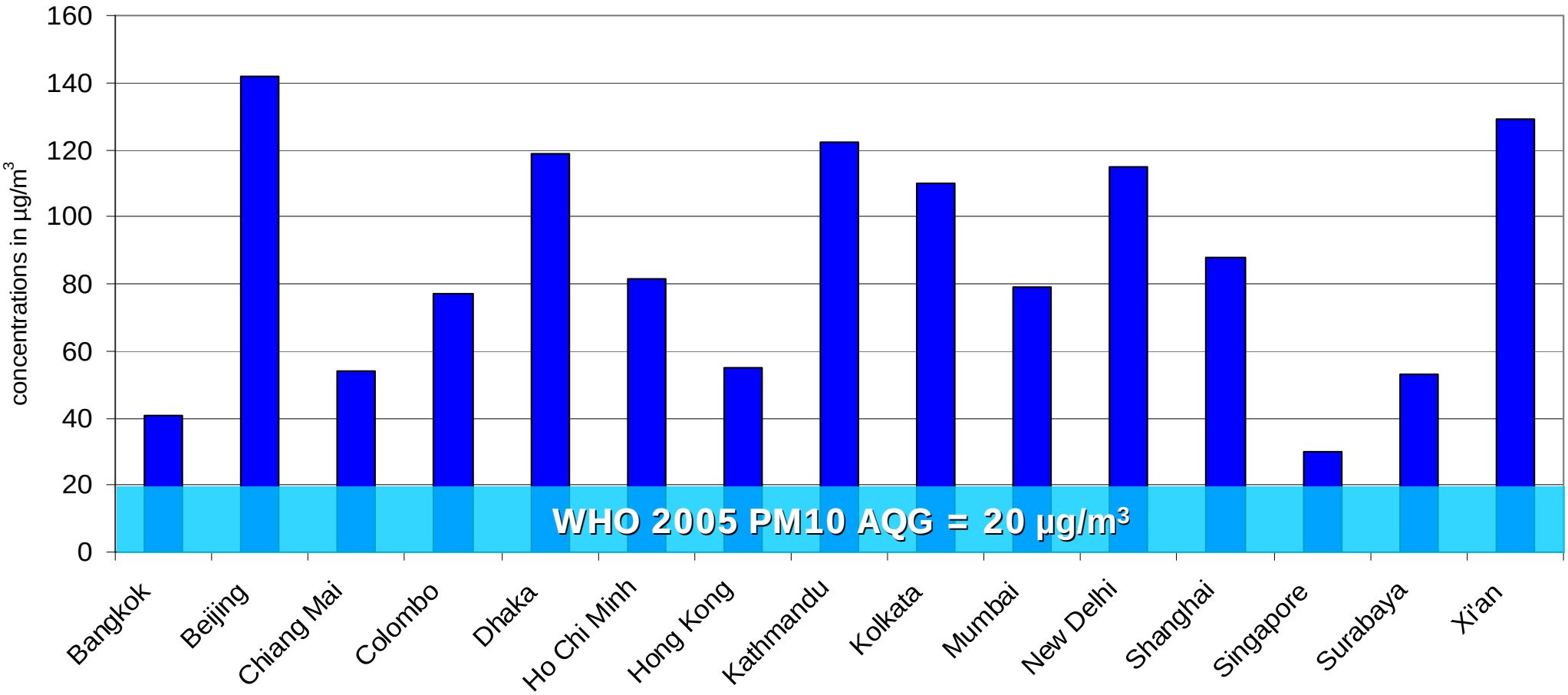
PM10 AQG: the future for all cities in Asia



Source: CAI-Asia

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WHO AQG for particulate matter (2 of 2)

24-hour mean level *)	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	Basis for the selected level
Interim target-1 (IT-1)	150	75	Aabout 5% increase of short-term mortality over AQG
Interim target-2 (IT-2)	100	50	Aabout 2.5% increase of short-term mortality over AQG
Interim target-3 (IT-3)	75	37.5	About 1.2% increase in short-term mortality over AQG
Air quality guidelines (AQG)	**50**	**25**	**Based on relation between 24-hour and annual PM levels**

*) 99th percentile (3 days / year)

WHO AQG for sulfur dioxide (SO_2)

	24-hour average SO_2	**10-minute average SO_2**
Interim target-1 (IT-1)	125 µg/m^3 2000 AQG level	-
Interim target-2 (IT-2)	50 µg/m^3 Intermediate goal based on controlling either (1) motor vehicle (2) industrial emissions and/or (3) power production; feasible goal to be achieved leading to significant health improvements that would justify further improvements	-
Air quality guidelines (AQG)	**20 µg/m^3**	**500 µg/m^3**

WHO AQG for ozone (O_3)

	Daily maximum 8-hour mean	Effects at the selected ozone level
High level	240 µg/m^3	Significant health effects, substantial proportion of vulnerable population affected.
Interim target-1 (IT-1)	160 µg/m^3	Important health effects, an intermediate target for populations with ozone concentrations above this level. Does not provide adequate protection of public health.
Air quality guideline (AQG)	**100 µg/m^3**	This concentration will provide adequate protection of public health, though some health effects may occur below this level.

WHO AQG for nitrogen dioxide (NO_2)

Annual mean: 40 µg/m³;

1-hour mean: 200 µg/m³.

The guideline values remain unchanged vs. AQG 2000.
Rationale:

- Experimental data: NO2 toxic above 200 µg/m3
- Epi studies: NO2 – marker of mixture of combustion related pollution
- Precursor of ozone and PM2.5

Summary of WHO AQG

Pollutant	Averaging time	AQG value
Particulate matter		
$PM_{2.5}$	1 year 24 hour (99th percentile)	**10 µg/m³** **25 µg/m³**
PM_{10}	1 year 24 hour (99th percentile)	**20 µg/m³** **50 µg/m³**
Ozone, O_3	8 hour, daily maximum	**100 µg/m³**
Nitrogen dioxide, NO_2	1 year 1 hour	**40 µg/m³** **200 µg/m³**
Sulfur dioxide, SO_2	24 hour 10 minute	**20 µg/m³** **500 µg/m³**

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THANK YOU !

http://www.euro.who.int/air

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