

Overview of the First Draft Risk and Exposure Assessment to Support the NO₂ Primary NAAQS

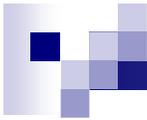
Presentation to CASAC

May 1, 2008



Overview of Presentation

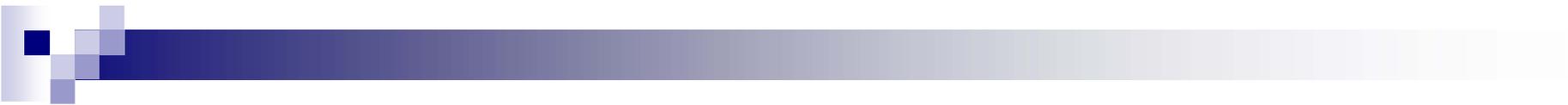
- Background
 - Timeline of current review
 - Purpose and scope of documents
- Overview of Approaches
 - Exposure
 - Risk
- Risk characterization based on air quality assessment
- Risk characterization based on exposure assessment



Timeline for Review

Major Milestones		Projected Completion Date	Projected CASAC Review Date
Integrated Review Plan	Draft Final	April 2007 June 2007	May 2007
Integrated Science Assessment	First Draft Second Draft Final	August 2007 March 2008 July 2008	October 2007 May 2008
Risk/Exposure Assessment	Plan First Draft Second Draft Final	September 2007 March 2008 August 2008 November 2008	October 2007 May 2008 September 2008
Rulemaking	ANPR Proposed Final	December 2008 May 2009 December 2009	January 2009

*Indicates that a single CASAC meeting will address both documents



Purpose and Scope of Documents

■ Purpose

- Convey the approach taken to characterize exposures and risks associated with ambient NO₂
- Present results of those assessments
- **Inform the rulemaking process**

■ Scope

- First draft documents consider recent NO₂ levels and levels associated with just meeting the current standard
 - Exposure assessment in single location (Philadelphia County)
- Subsequent drafts will also address levels associated with just meeting potential alternative standards
 - Exposure assessment will include additional locations



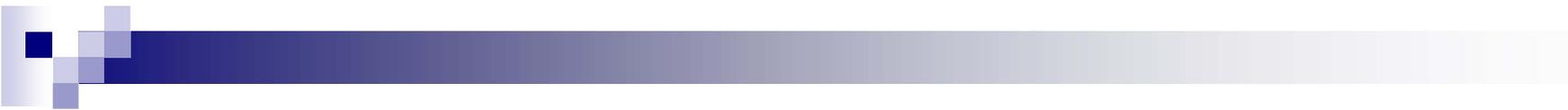
Overview of Approaches Used to Estimate Exposures and Characterize Risks

■ Exposure characterization

- Air quality analysis: Ambient levels of NO₂ derived from a combination of ambient monitors and modeling of levels on roadways
- Exposure analysis: Considers time spent in different microenvironments, with each microenvironment characterized by a unique NO₂ concentration

■ Risk characterization

- Estimates of population exposure compared to potential benchmark levels (0.20, 0.25, 0.30 ppm)
 - Levels identified from the controlled human exposure literature on airways responsiveness in asthmatics
 - Epidemiological literature will be used as part of an evidence-based approach to assessing the adequacy of potential alternative standards



Air Quality Analysis and Risk Characterization

- Selection of locations
 - AQS monitoring data used (1995-2006)
 - Locations chosen if they had high annual average and/or 1-hour levels
 - Annual average \geq 90th percentile and/or 1-hour levels above 200 ppb

- Scenarios evaluated
 - Ambient air quality as-is
 - Ambient air quality adjusted upwards such that levels of NO₂ in each location just meet the current standard
 - On-road levels of NO₂ modeled based on ambient air quality as-is
 - On-road levels of NO₂ modeled based on ambient air quality adjusted upwards such that levels of NO₂ in each location just meet the current standard

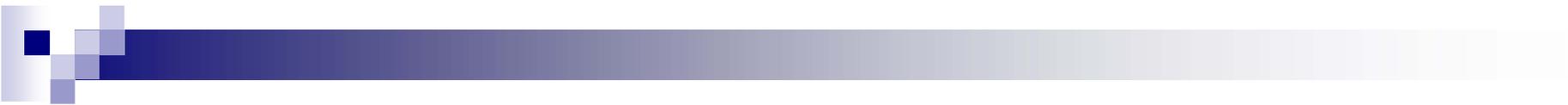
- Risk characterization
 - Number of exceedances of potential benchmark values estimated for each area

Estimated Number of Benchmark Exceedances

Estimated Mean (and 98th percentile) Number of Benchmark (200 ppb) Exceedances Per Year* by Location

Location	Ambient		On-Road		Location	Ambient		On-Road	
	As-Is	Roll-Up	As-Is	Roll-Up		As-Is	Roll-Up	As-Is	Roll-Up
Boston	0 (0)	0 (5)	1 (8)	87 (753)	Atlanta	0 (0)	8 (56)	1 (16)	335 (1647)
Chicago	0 (0)	1 (15)	10 (142)	176 (1022)	El Paso	0 (0)	7 (27)	1 (9)	389 (1604)
Cleveland	0 (0)	1 (4)	3 (36)	387 (1322)	Jacksonville	1 (2)	31 (72)	3 (23)	607 (1642)
Denver	0 (0)	2 (7)	8 (69)	277 (1233)	Las Vegas	0 (0)	1 (12)	1 (15)	278 (1929)
Detroit	1 (12)	8 (45)	5 (44)	440 (1444)	Phoenix	0 (0)	0 (1)	3 (44)	149 (1172)
Los Angeles	0 (0)	0 (5)	11 (131)	106 (788)	Provo	0 (0)	88 (526)	70 (662)	516 (1966)
Miami	0 (3)	17 (69)	0 (7)	406 (1345)	St. Louis	0 (0)	0 (5)	1 (7)	182 (1100)
New York	0 (0)	0 (2)	9 (90)	84 (709)	Other CMSA	0 (0)	0 (3)	0 (5)	64 (569)
Philadelphia	0 (0)	1 (25)	1 (14)	174 (973)	Not MSA	0 (0)	3 (44)	0 (4)	101 (874)
Washington	0 (0)	0 (5)	1 (14)	208 (1171)					

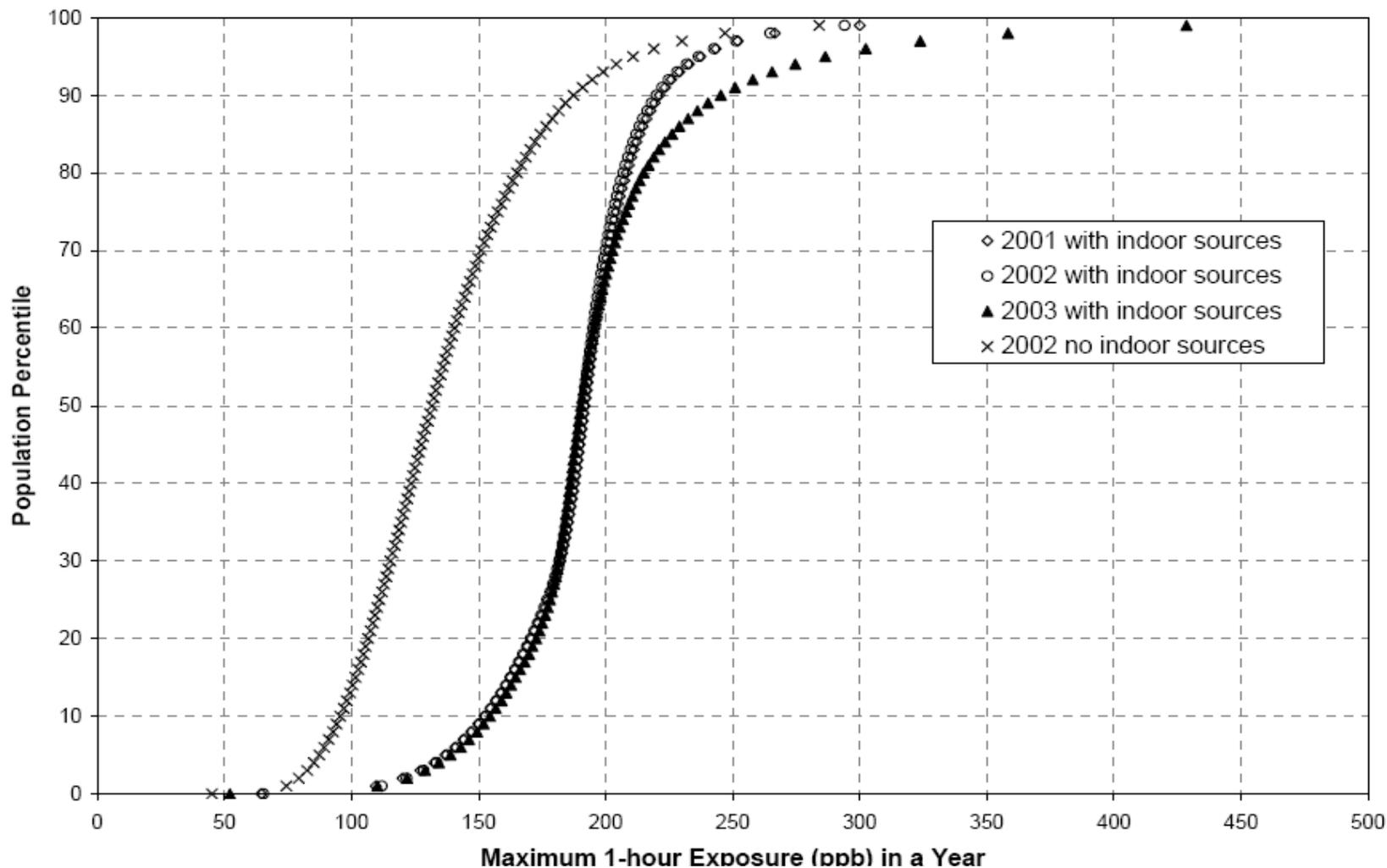
*Mean estimated exceedances per year based on the years 2001-2006



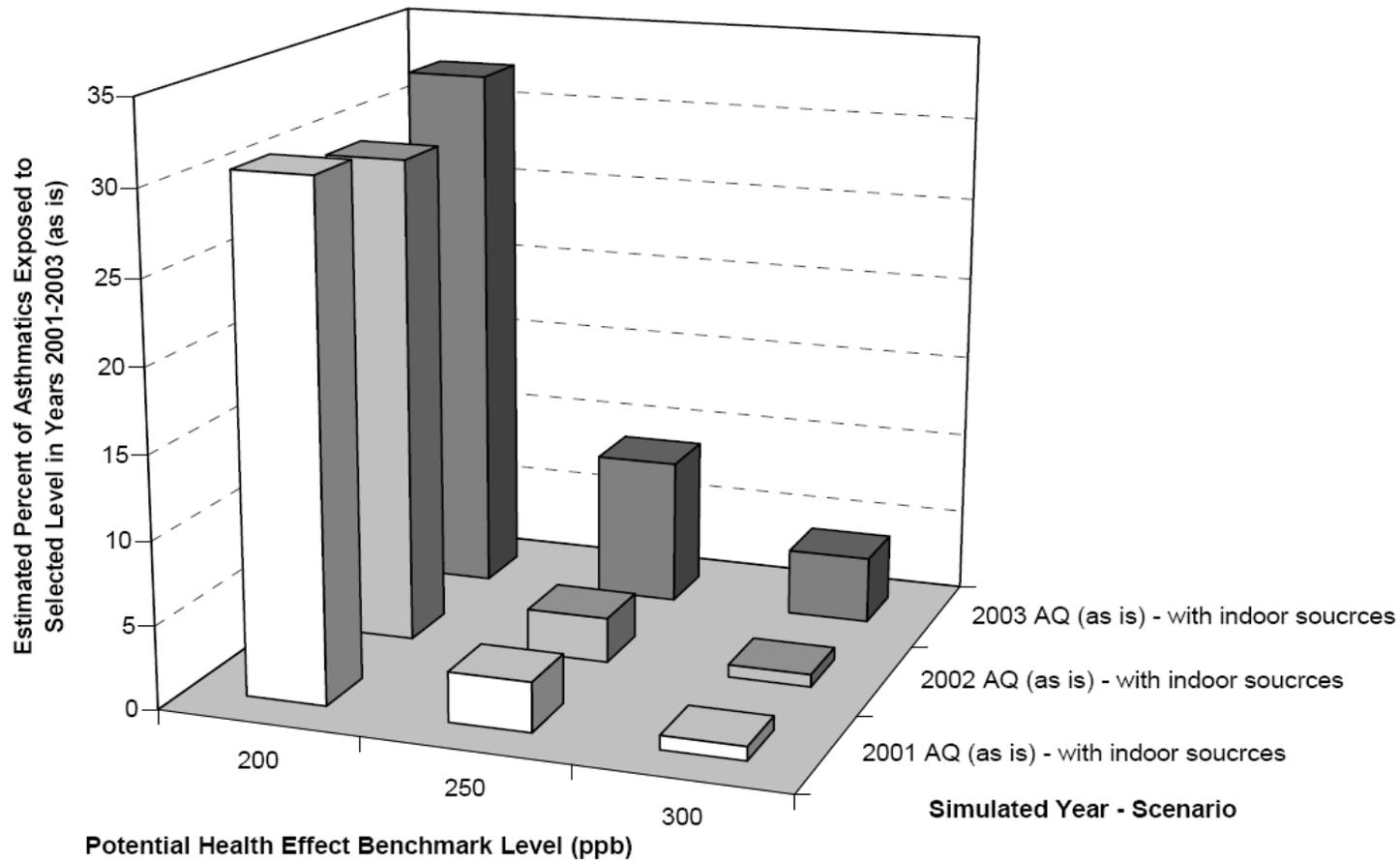
Exposure Analysis and Risk Characterization

- Probabilistic approach was used to estimate population exposures
- Approach considers the time people spend in different microenvironments and variable NO₂ concentrations that occur within these microenvironments
- Estimates of exposure were compared to potential health benchmark values
- Initial focus was on Philadelphia
 - Additional locations will be evaluated for subsequent drafts

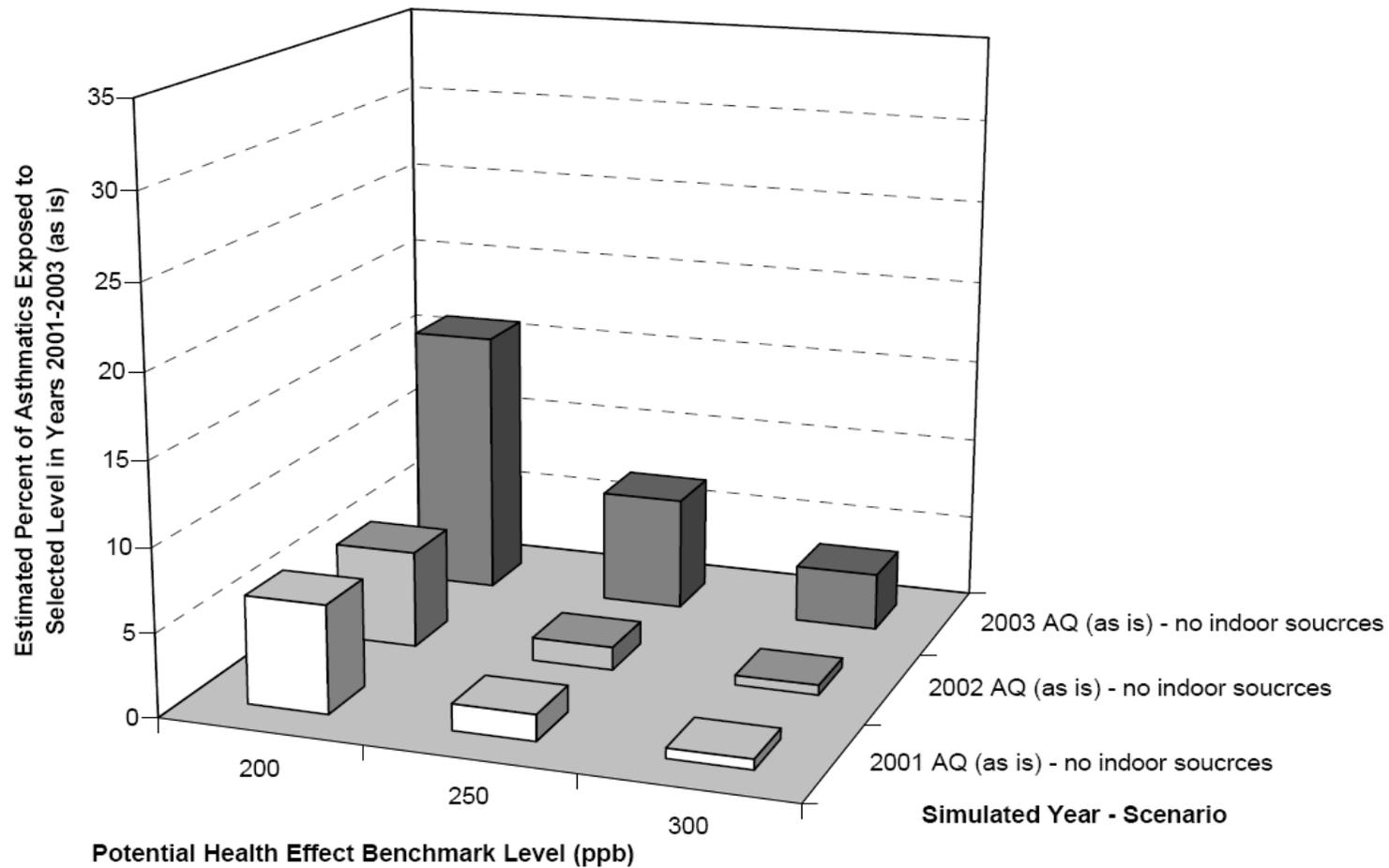
Estimated 1-hour NO₂ Exposures: Air Quality As-Is



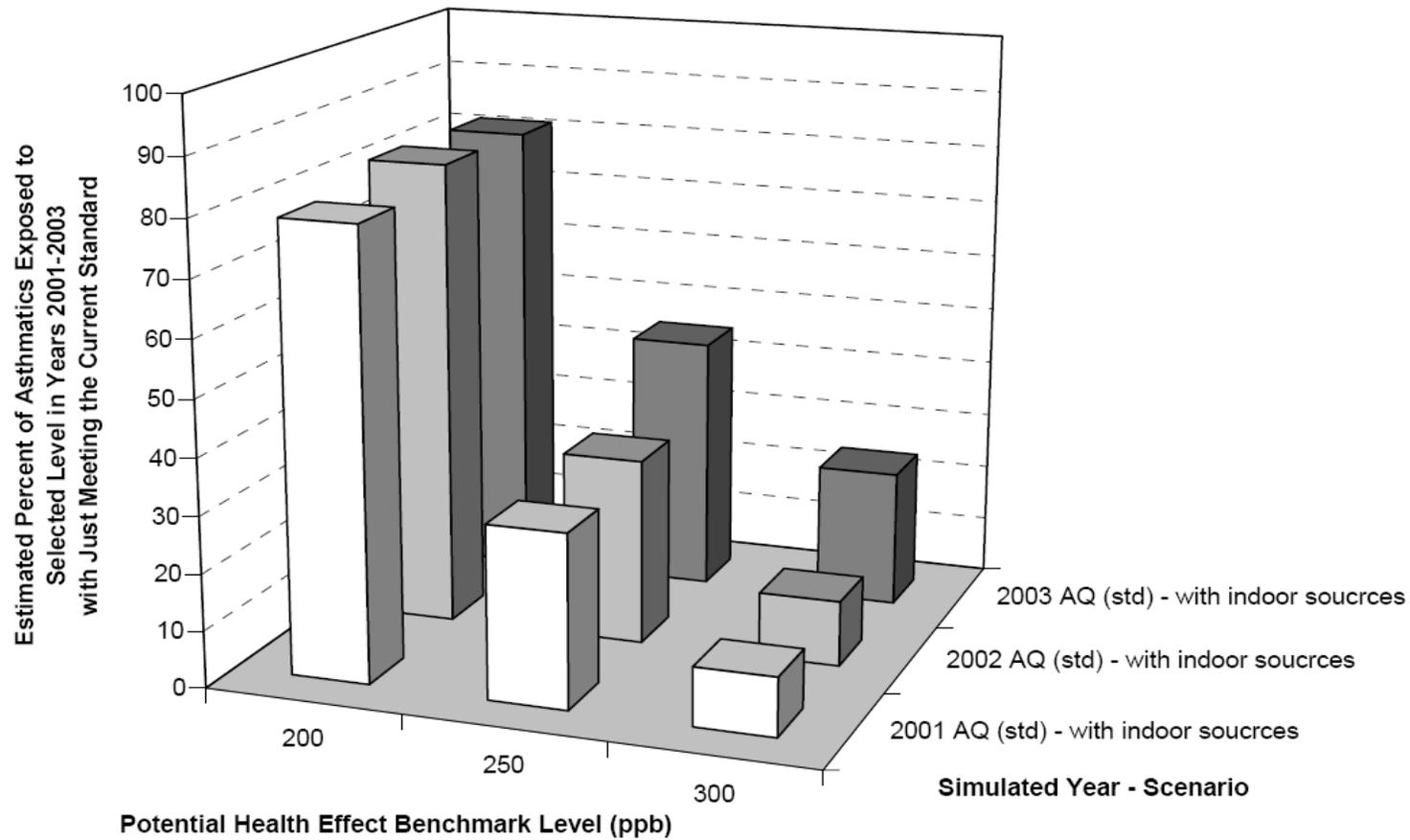
Percent of Asthmatics with at Least One Exceedance: Air Quality As-Is



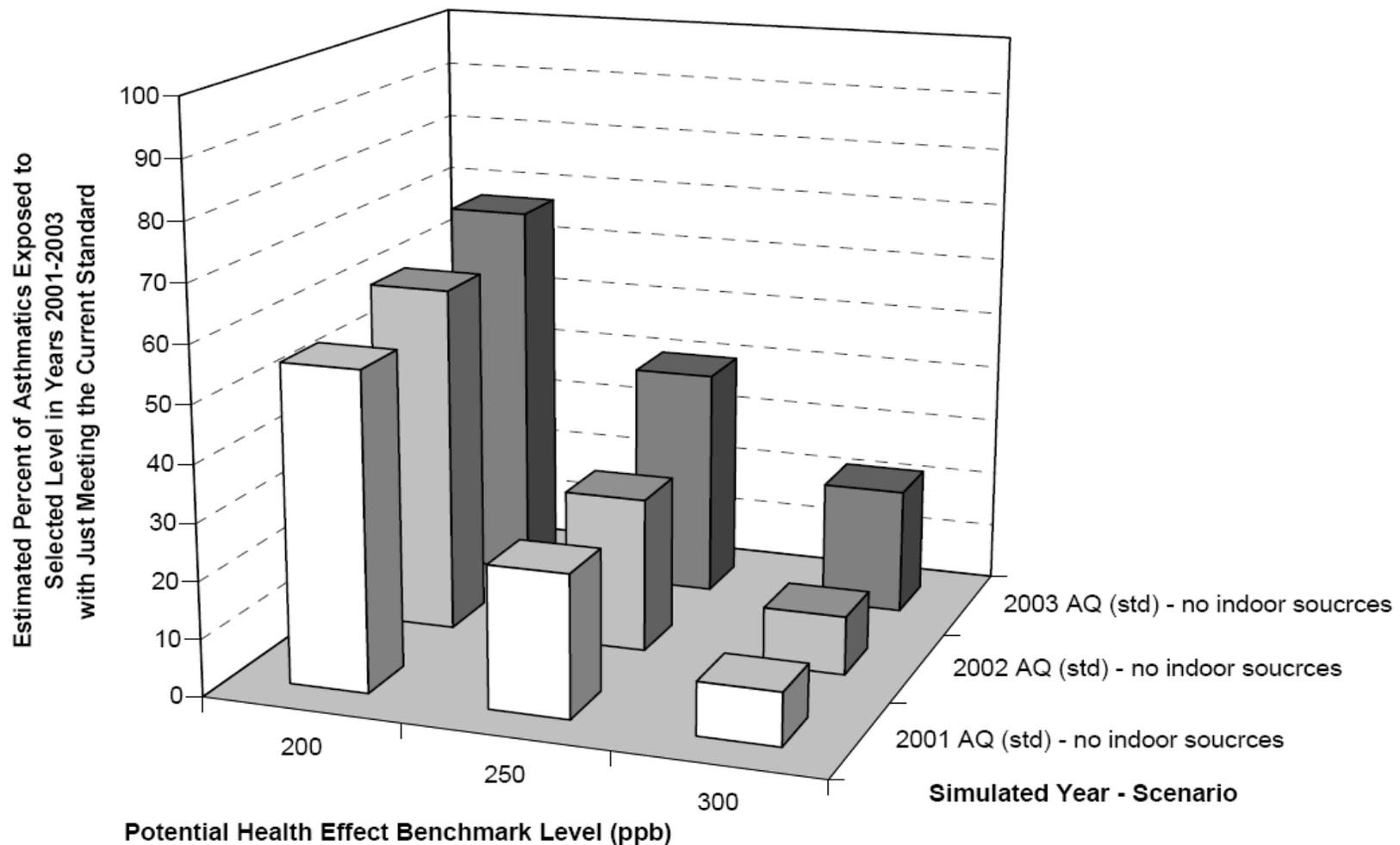
Percent of Asthmatics with at Least One Exceedance (No Indoor Sources): Air Quality As-Is



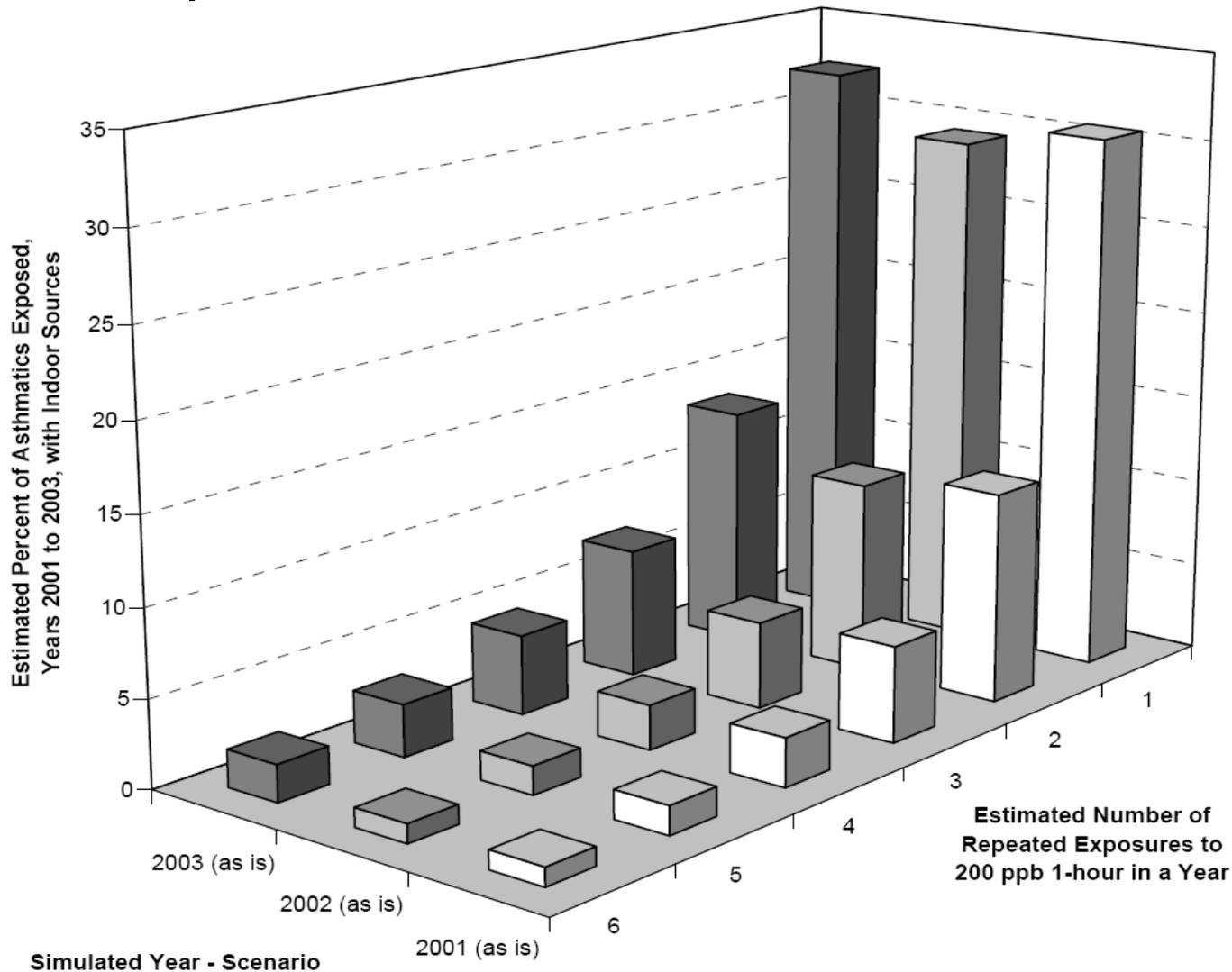
Percent of Asthmatics with at Least One Exceedance: Just Meeting Current Standard



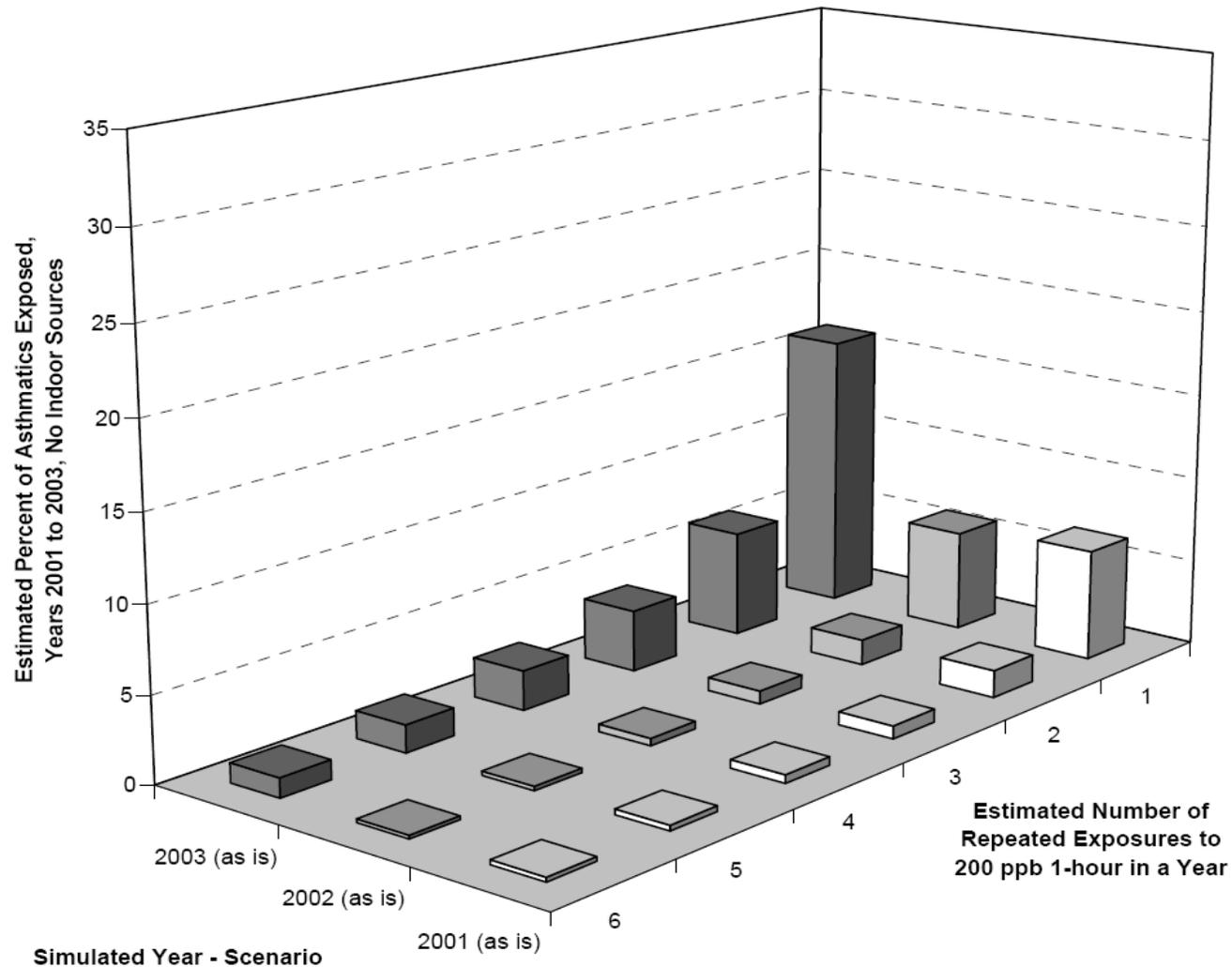
Percent of Asthmatics With at Least One Exceedance (No Indoor Sources): Just Meeting Current Standard



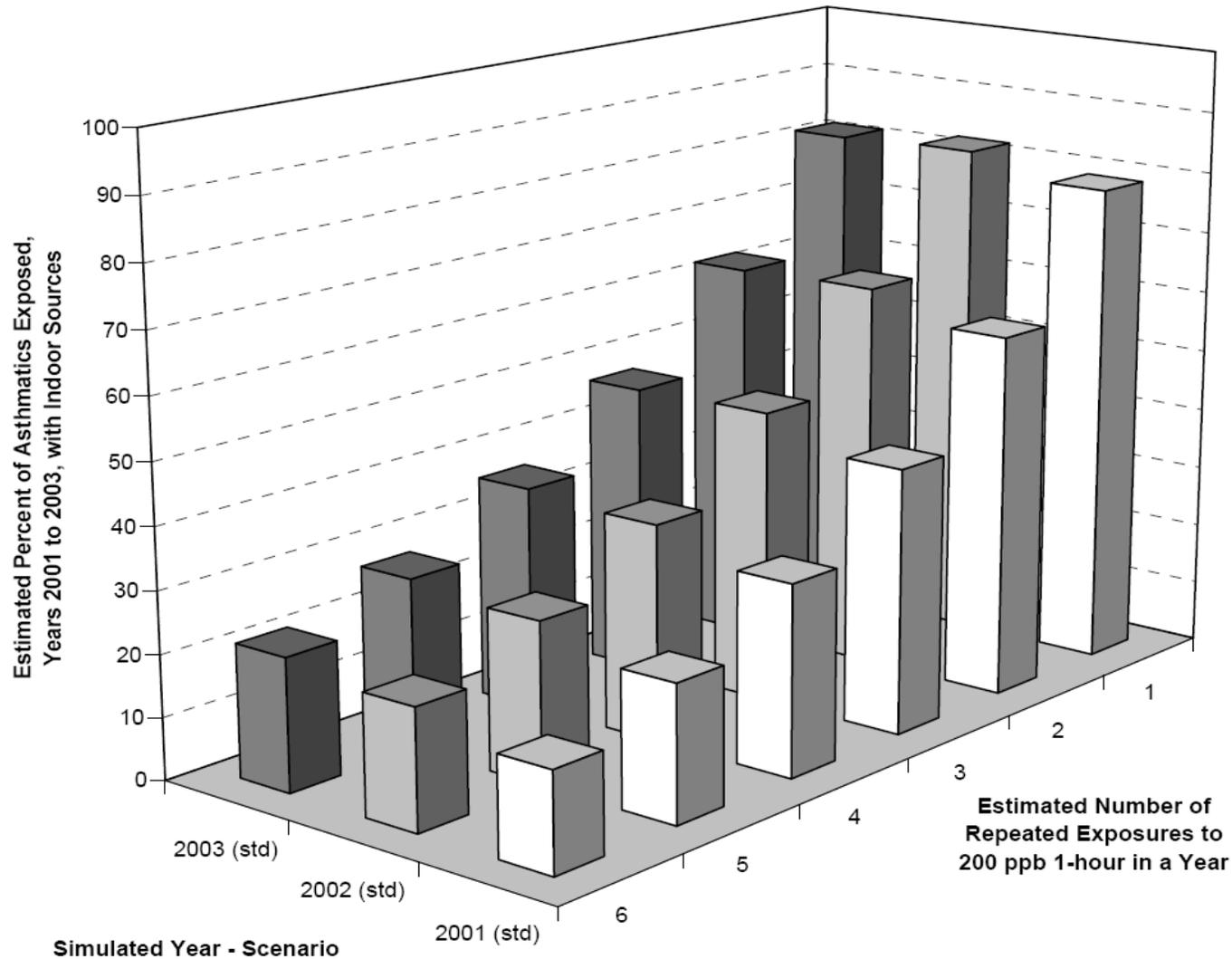
Percent of Asthmatics With Repeated Exceedances: Air Quality As-Is



Percent of Asthmatics With Repeated Exceedances (No Indoor Sources): Air Quality As-Is



Percent of Asthmatics With Repeated Exceedances: Just Meeting Current Standard



Percent of Asthmatics With Repeated Exceedances (No Indoor Sources): Just Meeting Current Standard

