



PROGRAMA DE INSPEÇÃO E MANUTENÇÃO I/M-SP – ESTATÍSTICAS BÁSICAS 2010

**Gabriel M. Branco
Fábio C. Branco
Alfred Szwarc**

São Paulo, Maio 2011

BENEFÍCIO FINAL I/M-SP

Objetivos do trabalho:

- **Avaliar os resultados do Programa de Inspeção Veicular;**
- **Quantificar os benefícios ambientais;**
- **Avaliar o Programa I/M-SP como política pública para melhoria da saúde.**



RESOLUÇÃO CONAMA Nº 18/86

Política Pública

I - Instituir, em caráter nacional, o PROGRAMA DE CONTROLE DA POLUIÇÃO DO AR POR VEÍCULOS AUTOMOTORES - **PROCONVE**, com os objetivos de :

- **reduzir os níveis de emissão** de poluentes por veículos automotores visando o atendimento aos Padrões de Qualidade do Ar, especialmente nos centros urbanos;
- **promover o desenvolvimento tecnológico nacional**, tanto na engenharia automobilística, como também em métodos e equipamentos para ensaios e medições da emissão de poluentes;
- **criar programas de inspeção e manutenção** para veículos automotores em uso;
- promover a **conscientização da população** com relação à questão da poluição do ar por veículos automotores;
- **estabelecer condições de avaliação** dos resultados alcançados;
- promover a **melhoria das características técnicas dos combustíveis** líquidos, postos à disposição da frota nacional de veículos automotores, visando a redução de emissões poluidoras à atmosfera;



PRINCÍPIOS DO PROGRAMA

Capítulo VI: *Estabelece os LIMITES MÁXIMOS DE EMISSÃO de poluentes do ar para os motores e veículos automotores novos;*

Capítulo VIII: **os limites de emissão para a Inspeção de Veículos em Uso** devem se basear nas **especificações certificadas pelo fabricante** junto ao IBAMA, ficando os limites correspondentes para homologação de tipo, apenas como máximos de referência.

OBJETIVOS:

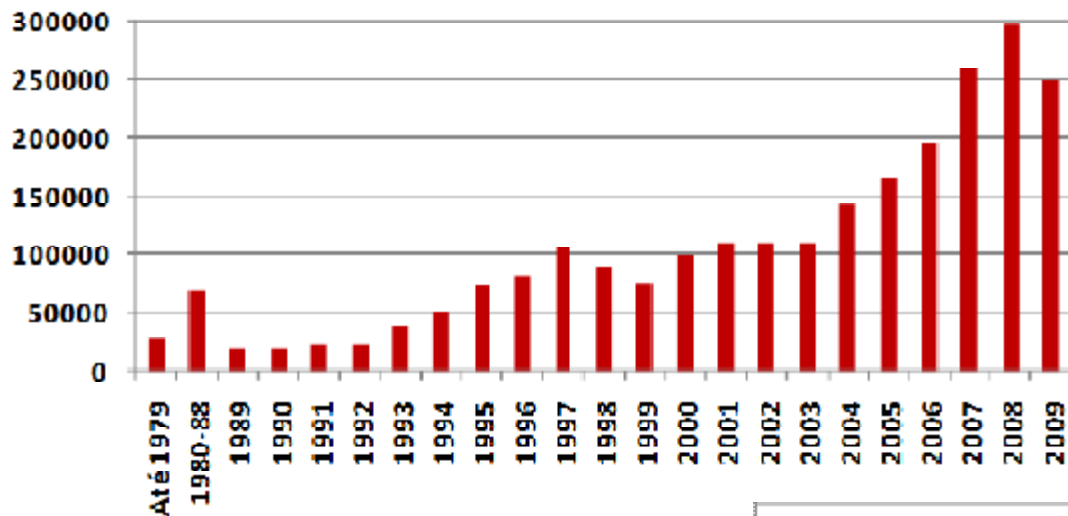
recuperar os aumentos de emissão provocados durante o uso
identificar desconformidades de produção e **realimentar o PROCONVE**

CONCEITO:

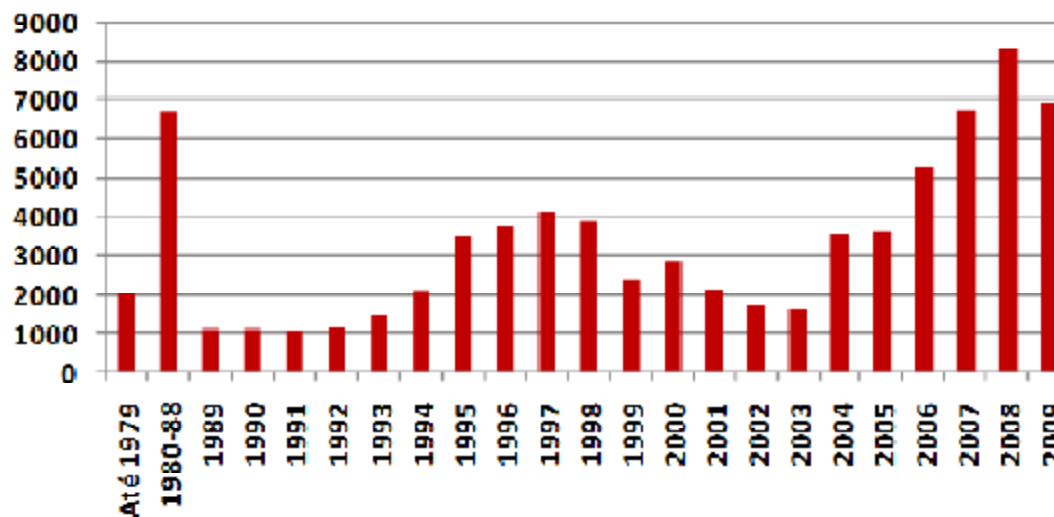
- **identificar adulterações** dos veículos em uso em relação às suas especificações originais certificadas e demais exigências do PROCONVE;
- **falhas de manutenção** e **baixa durabilidade** de componentes
- **existência de itens de ação indesejável** (Resolução CONAMA nº230/97)

FROTA INSPECIONADA I/M-SP OTTO

Ano de fabricação - automóveis

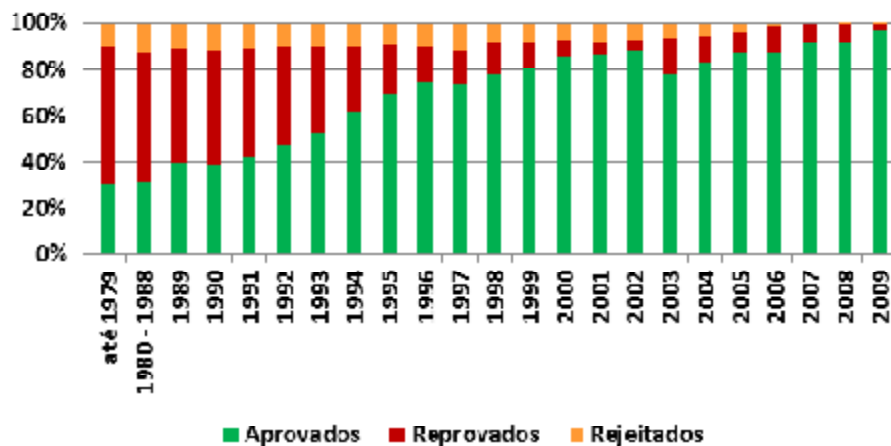


Ano de fabricação - utilitários

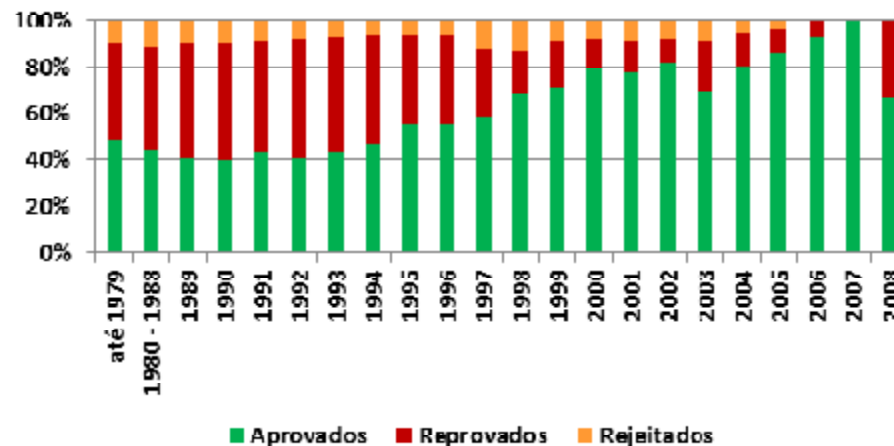


Resultados das inspeções - Otto

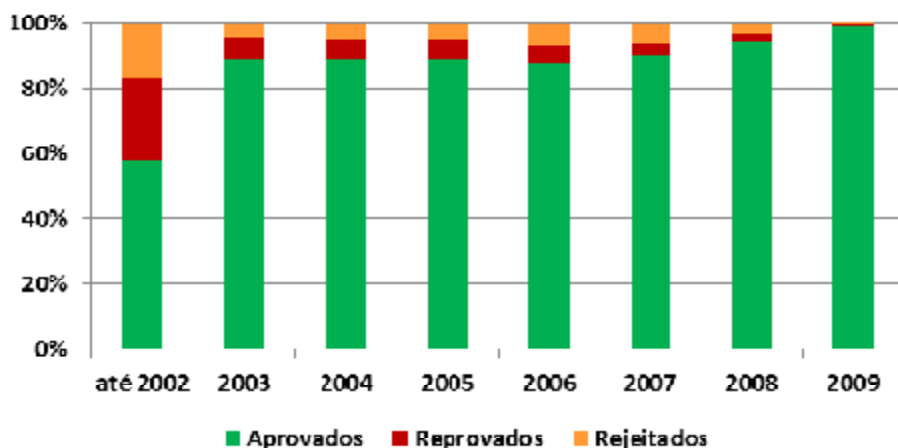
Resultados - Gasolina



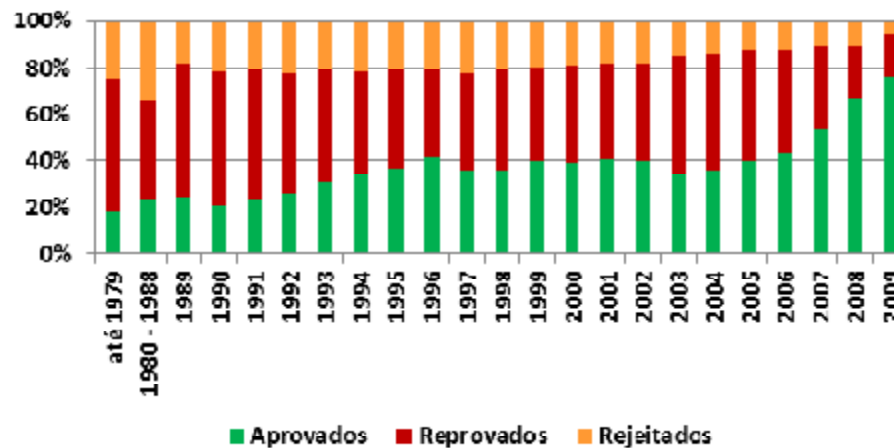
Resultados - Álcool



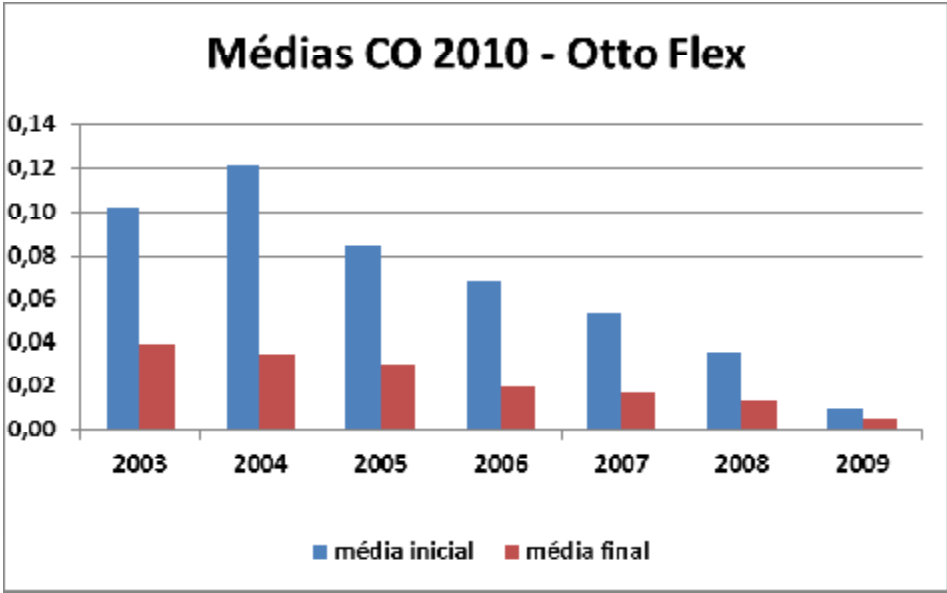
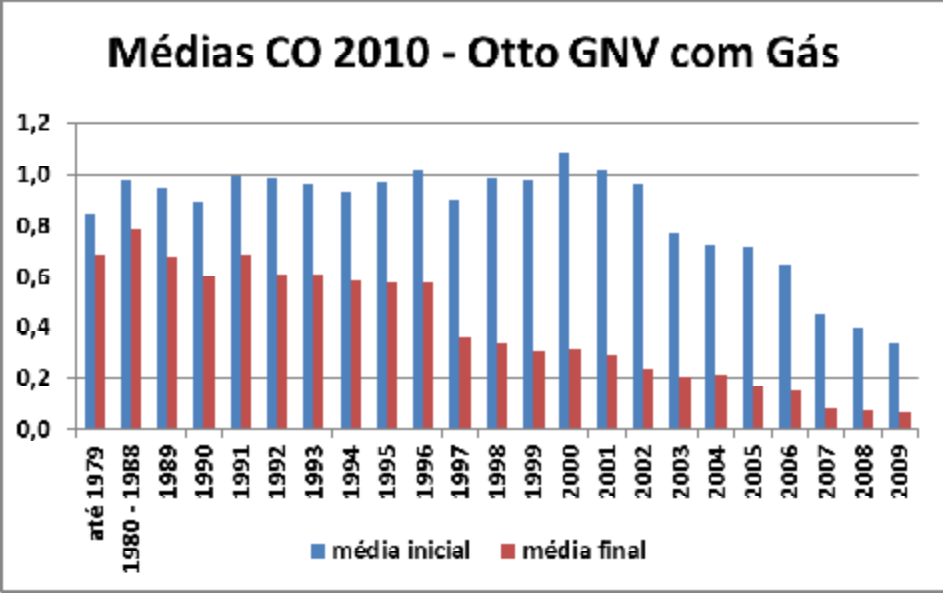
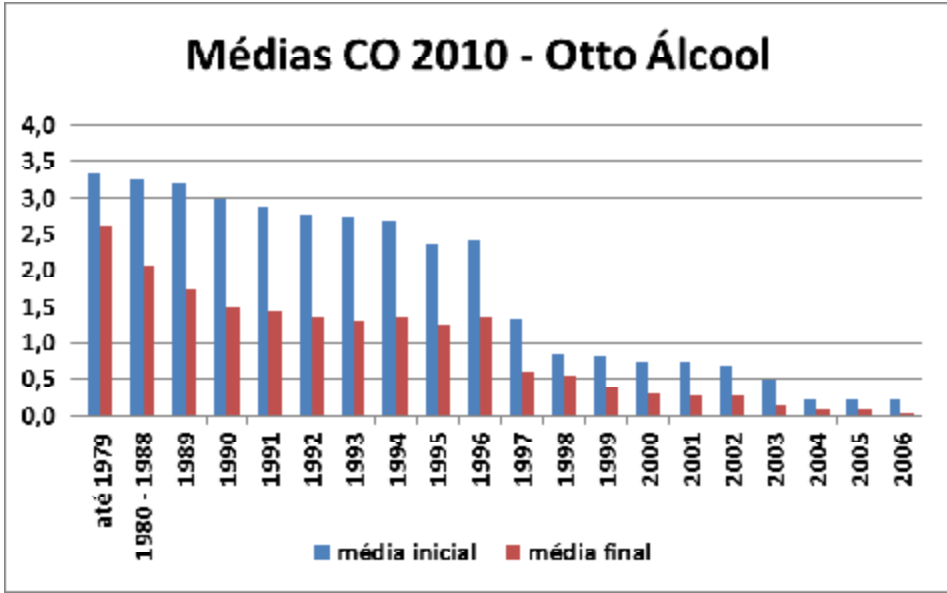
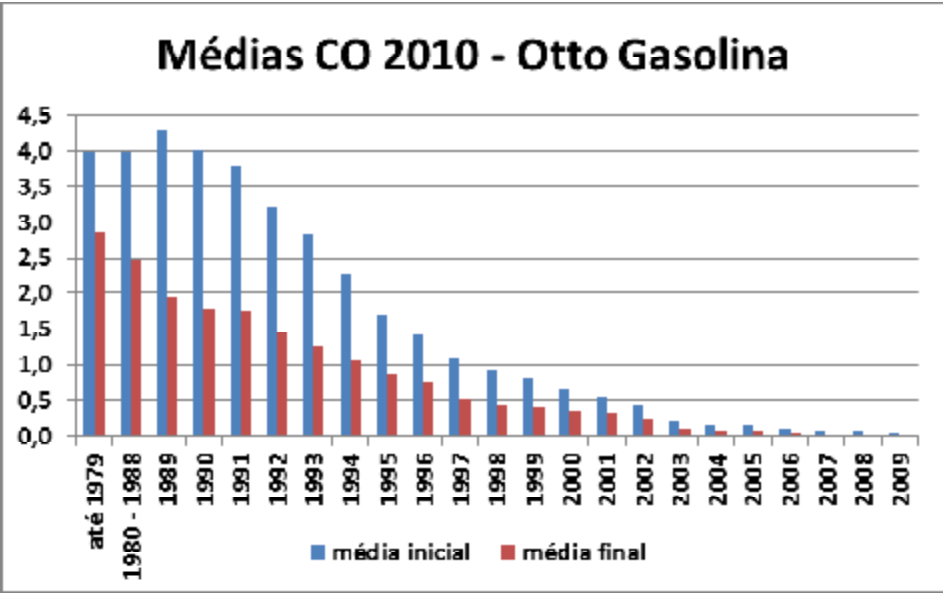
Resultados - Flex



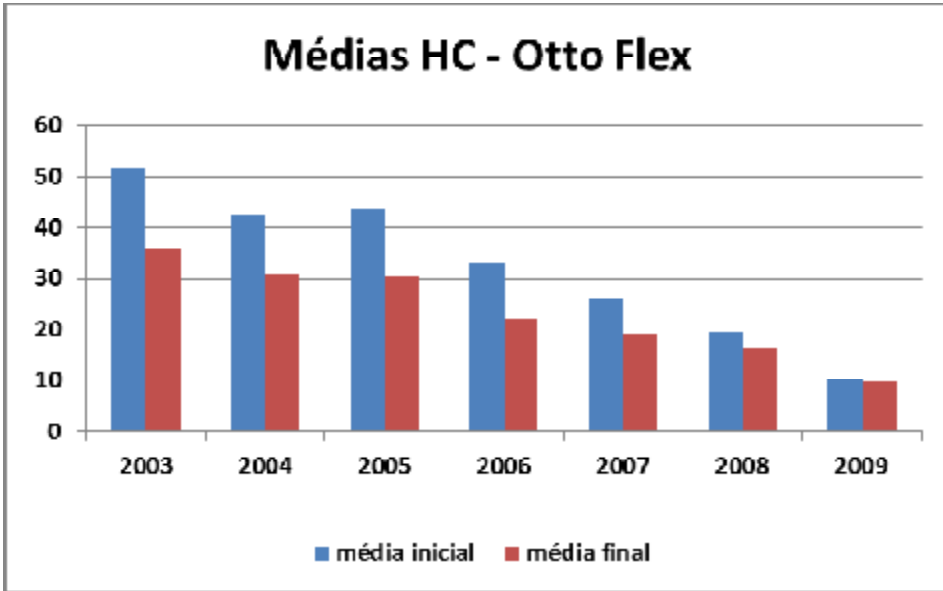
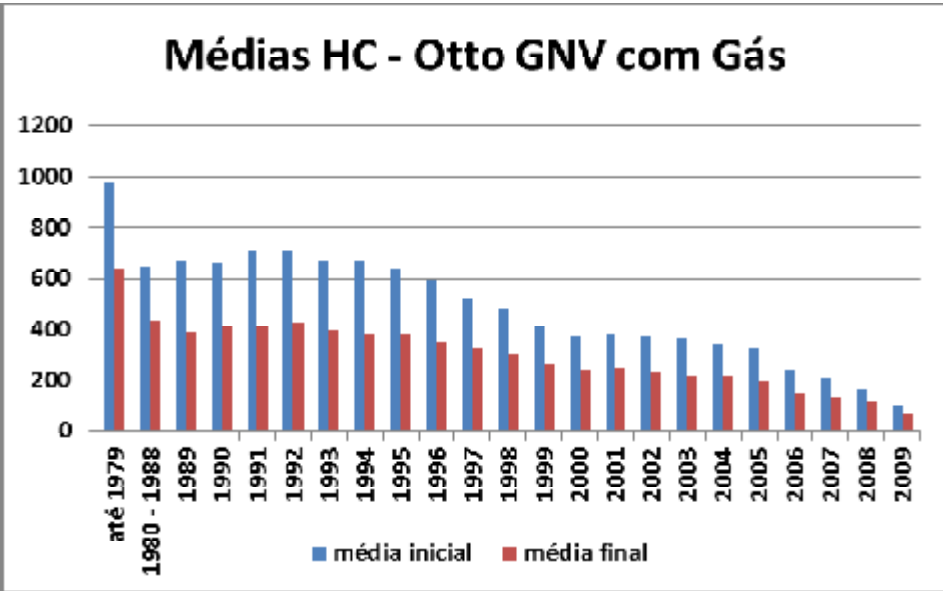
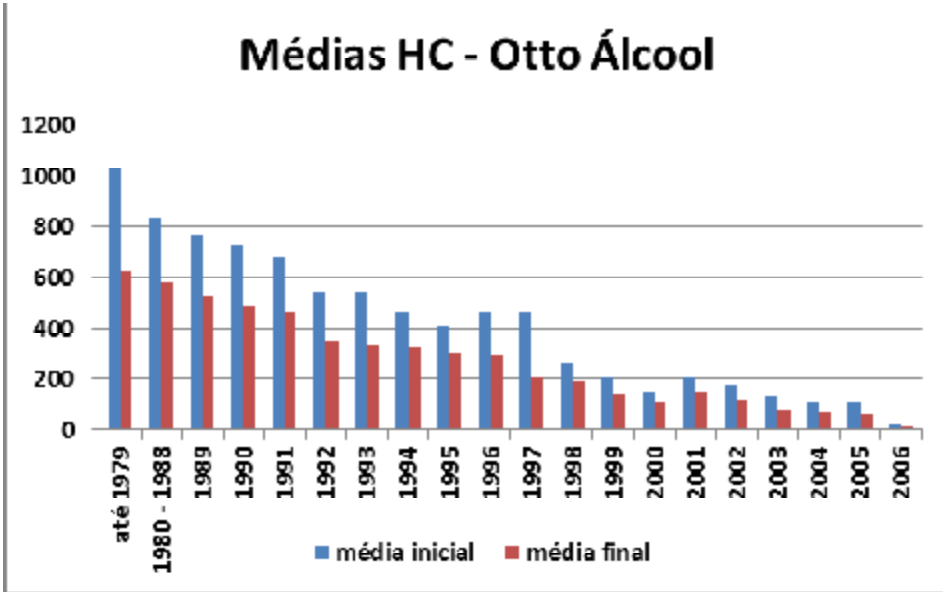
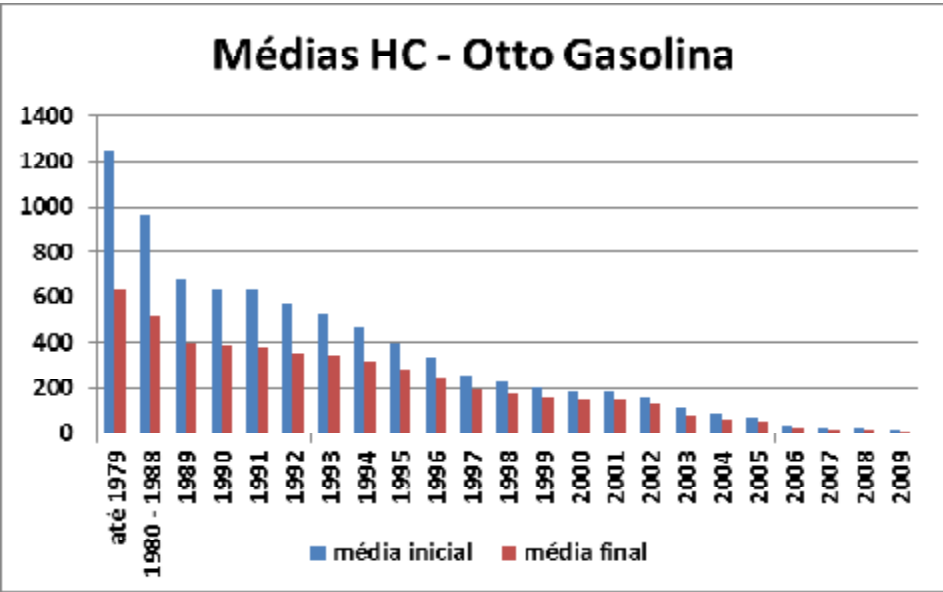
Resultados - GNV



MÉDIAS de CO – Otto 2010

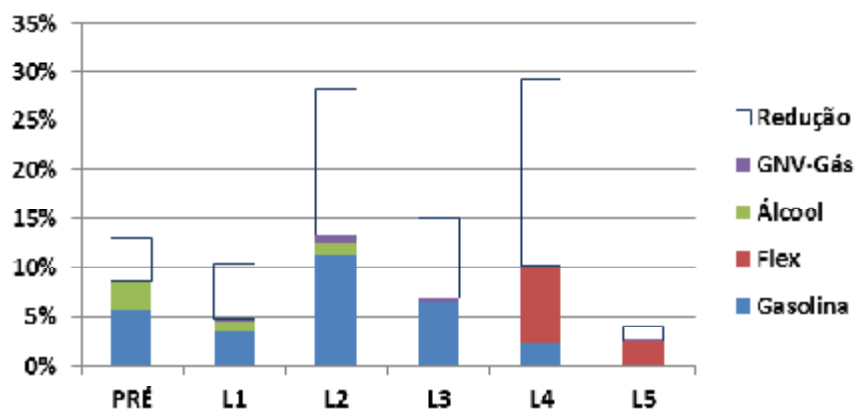


MÉDIAS de HC – Otto 2010



Impactos Ambientais – Otto

Emissão anual FINAL da frota inspecionada - CO (ton/ano)

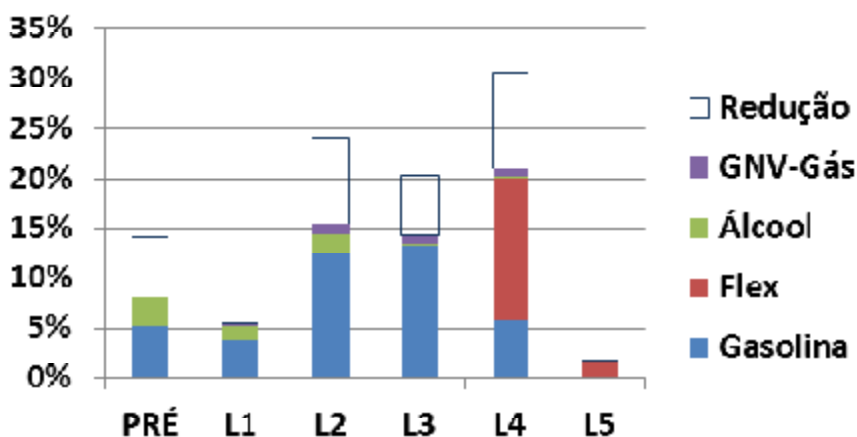


Frota inspecionada: 2.483.085

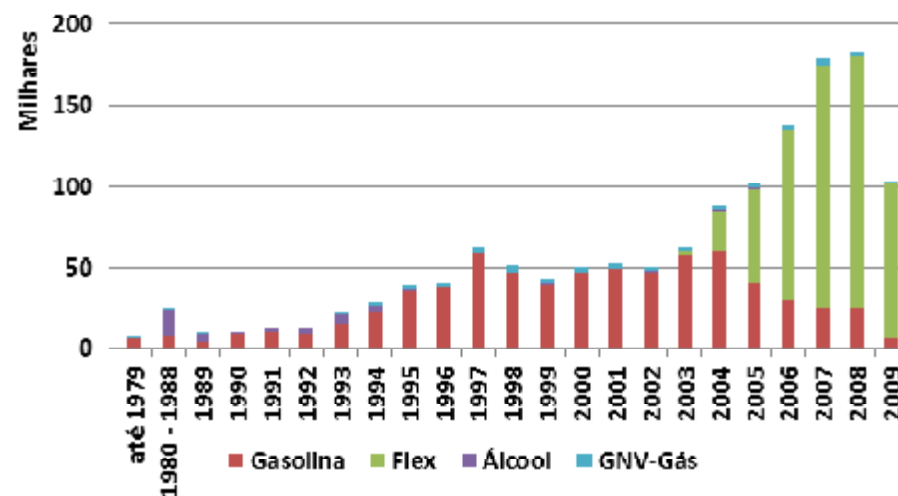
Benefício ambiental expresso em veículos equivalentes "retirados" de circulação:

- **CO: 1.371.231 (benefício: 54%)**
- **HC: 749.593 (benefício: 47%)**

Emissão anual FINAL da frota inspecionada - HC (ton/ano)

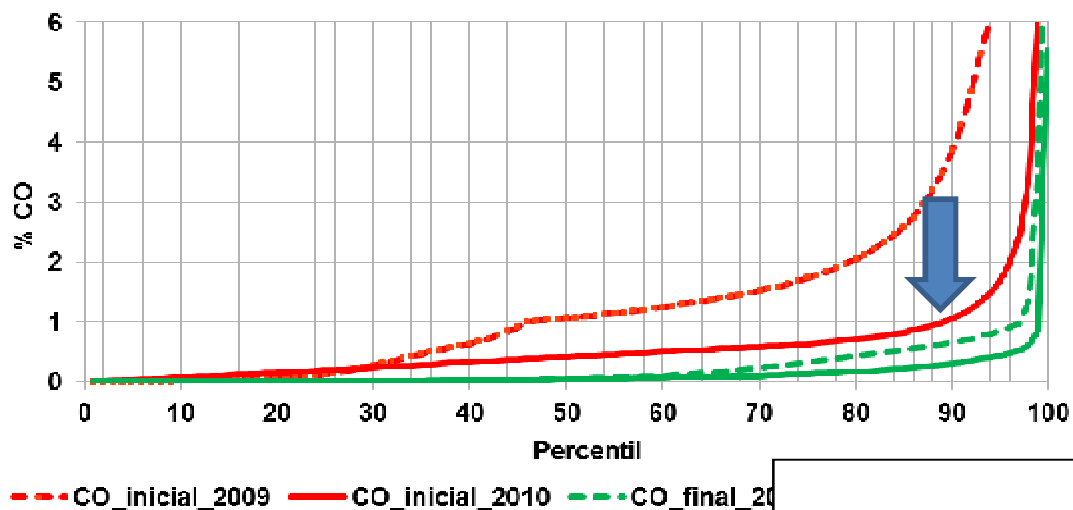


Veículos equivalentes "retirados"

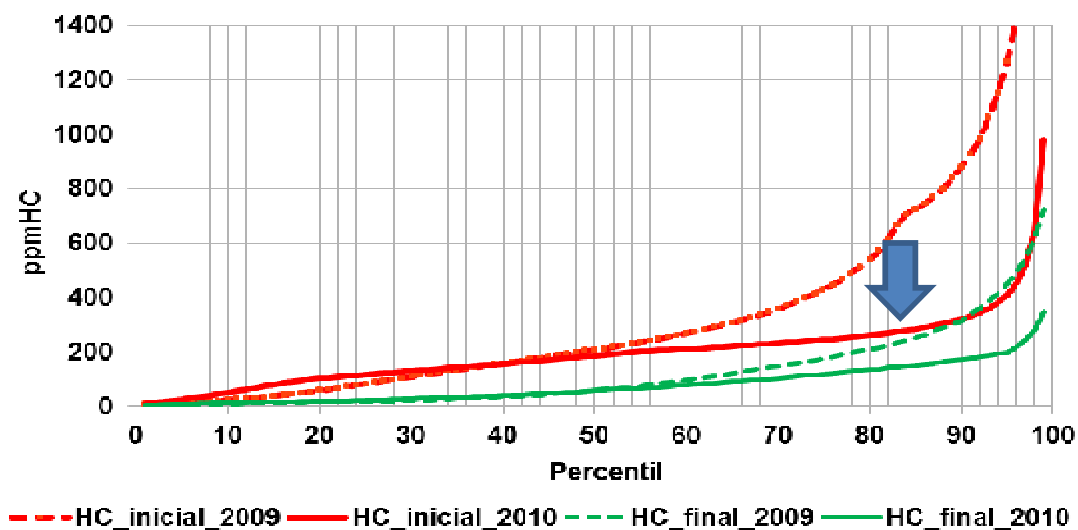


APRENDIZADO I/M-SP - OTTO

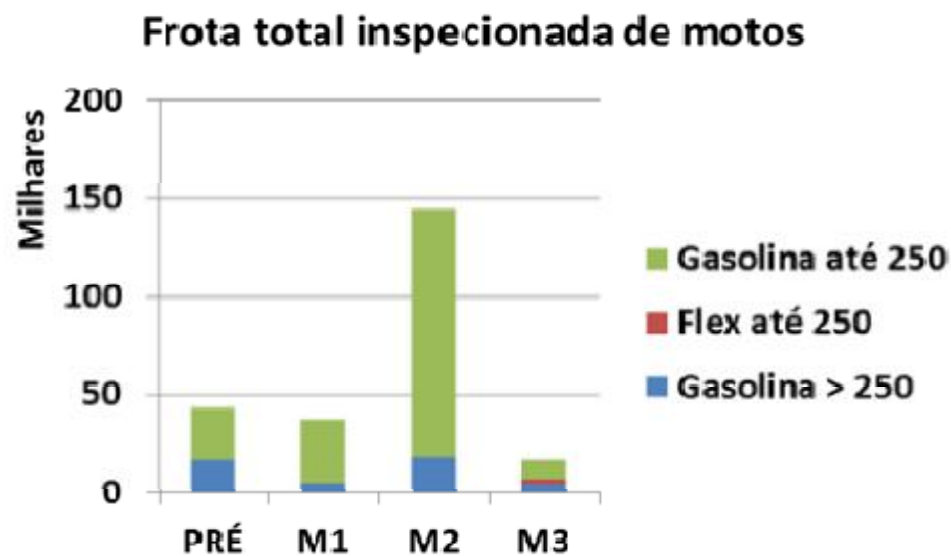
**Condição Inicial e Final CO - Otto a gasolina
Base 2003 a 2008**



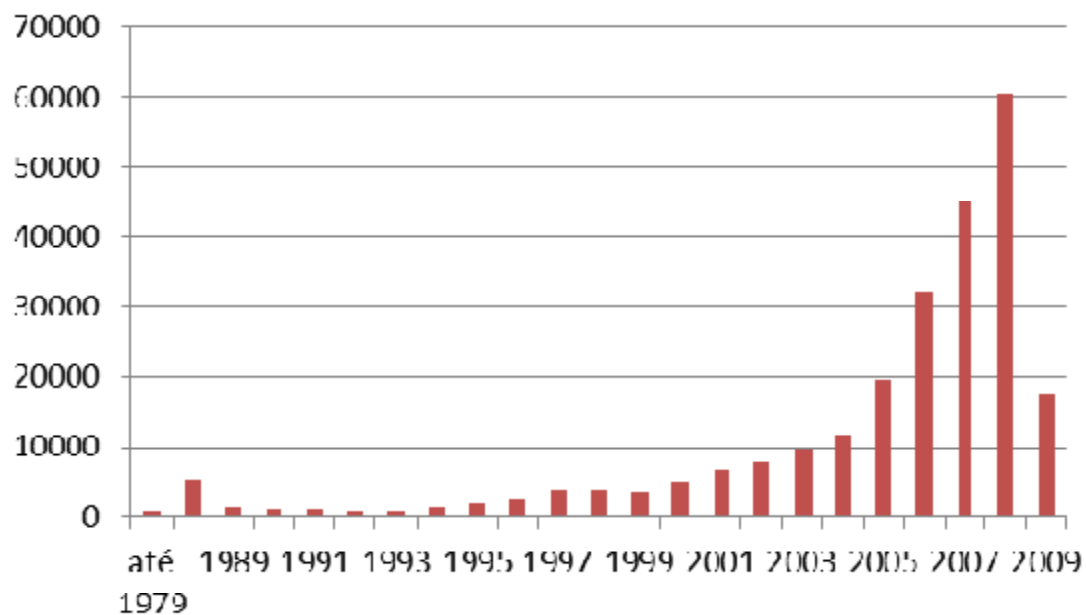
**Condição Inicial e Final HC - Otto a gasolina
Base 2003 a 2008**



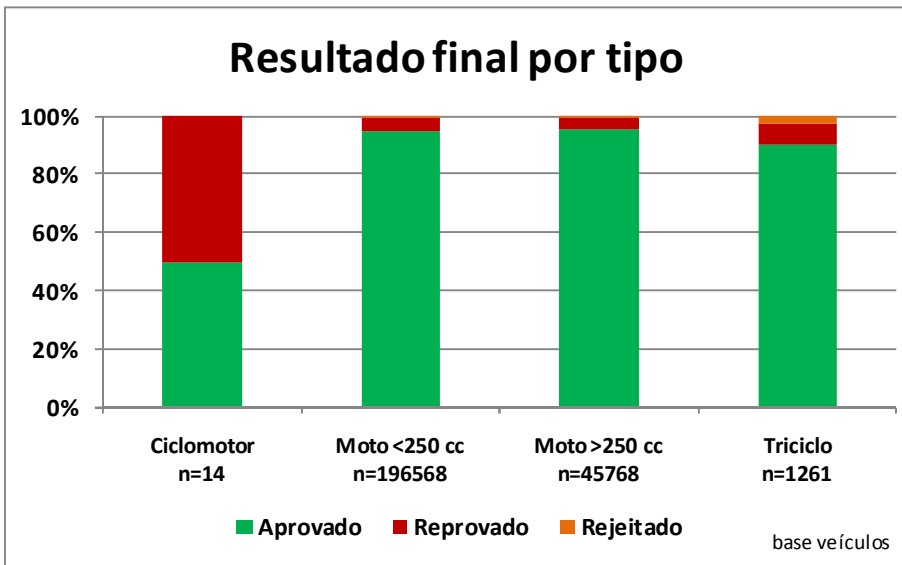
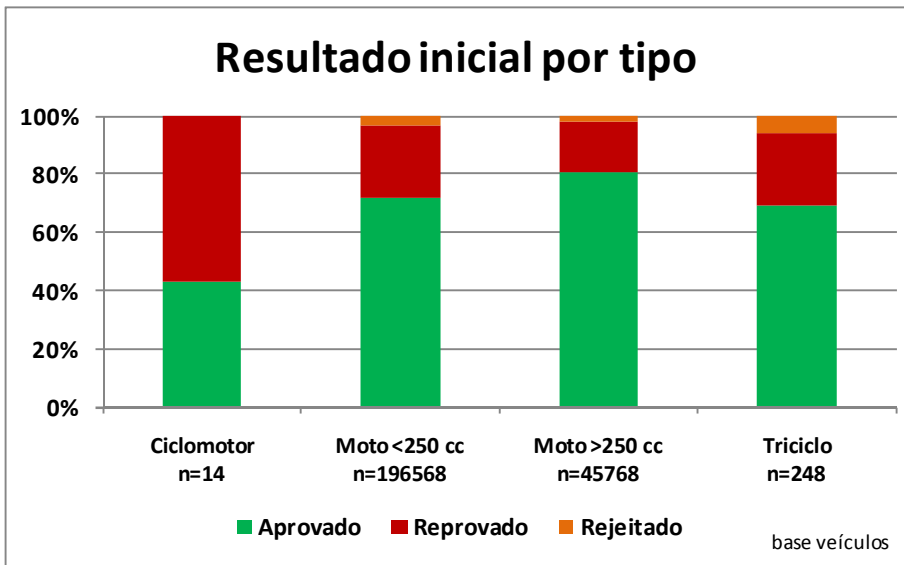
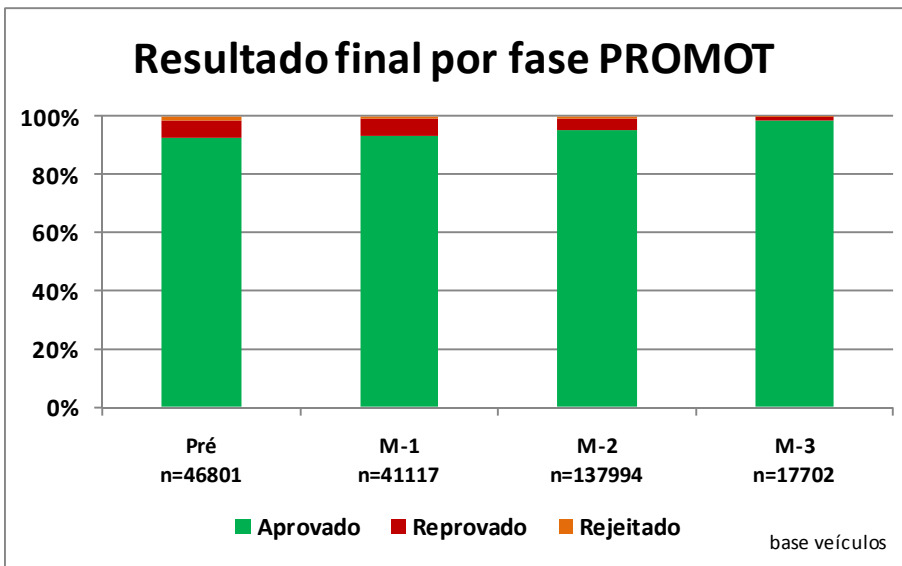
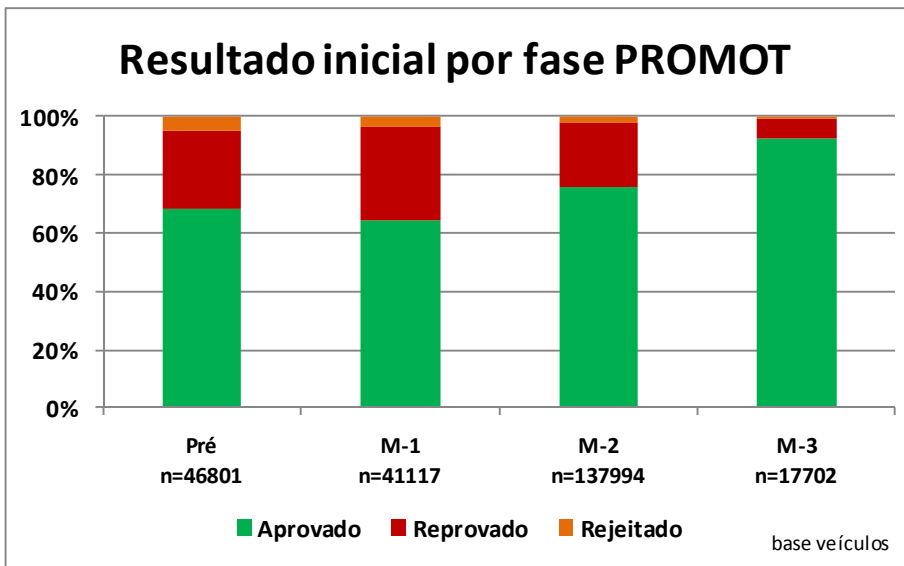
FROTA INSPECIONADA - MOTOS



Ano de fabricacao

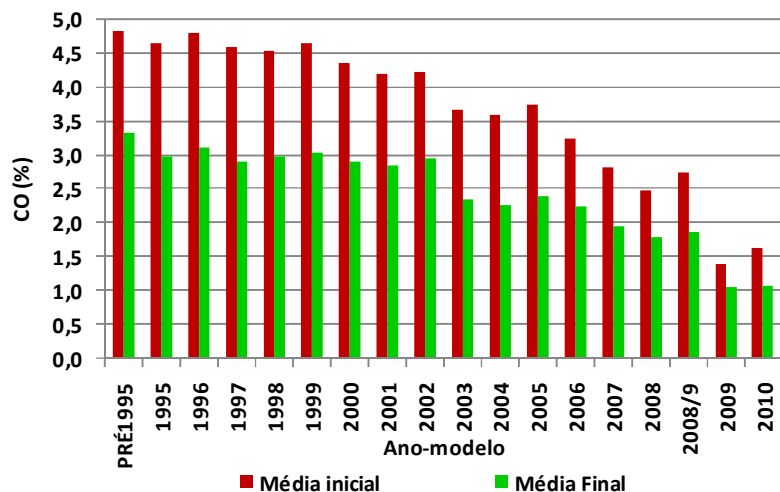


Resultados – situação inicial e final

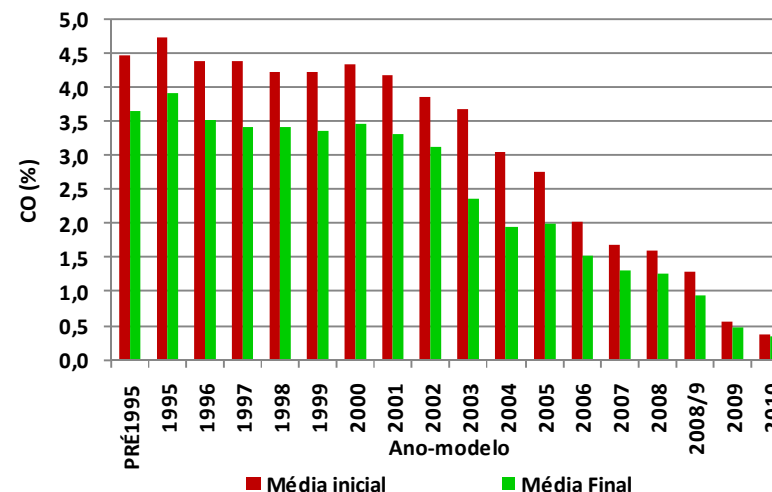


Emissões médias das motos - CO

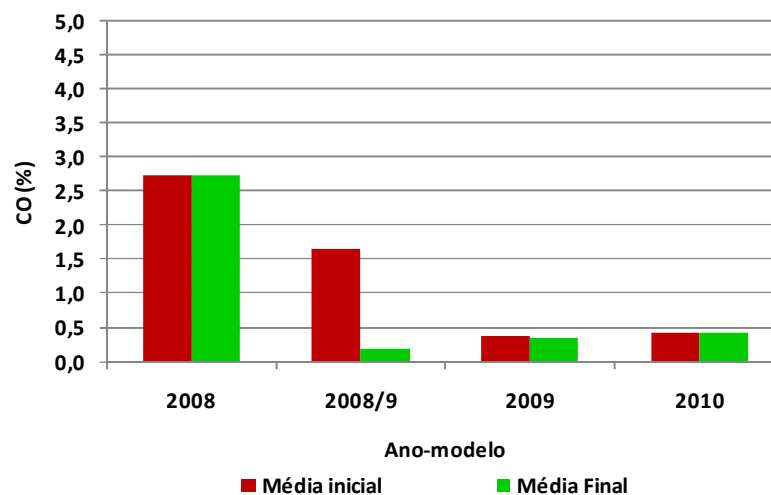
Médias CO - gasolina até 250cc



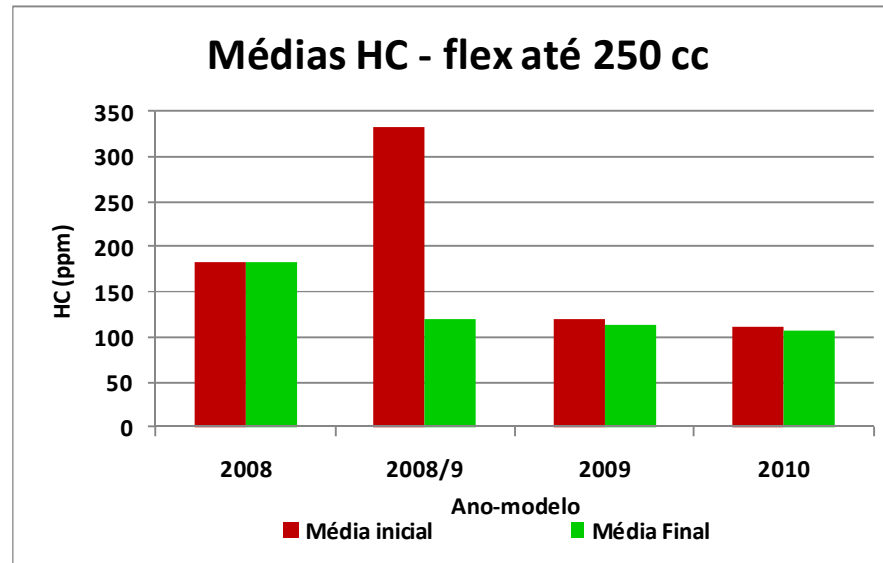
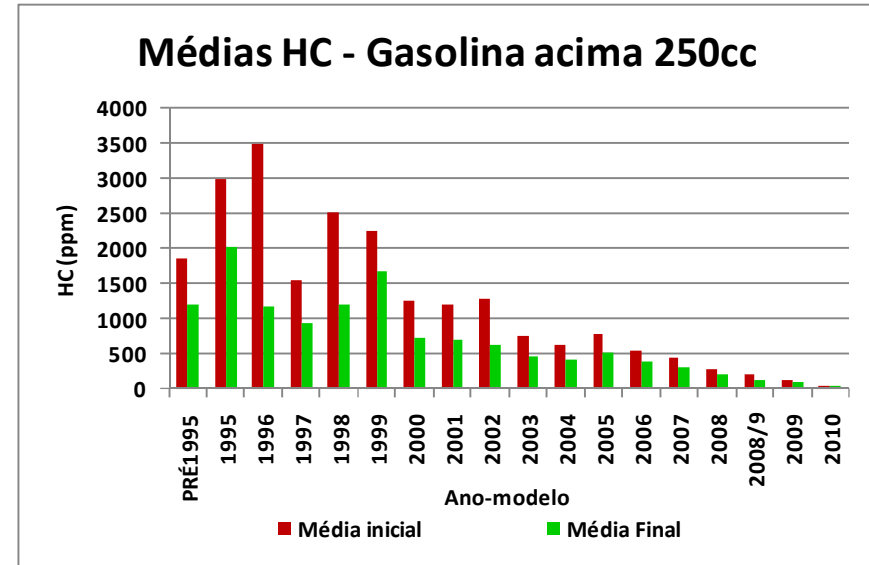
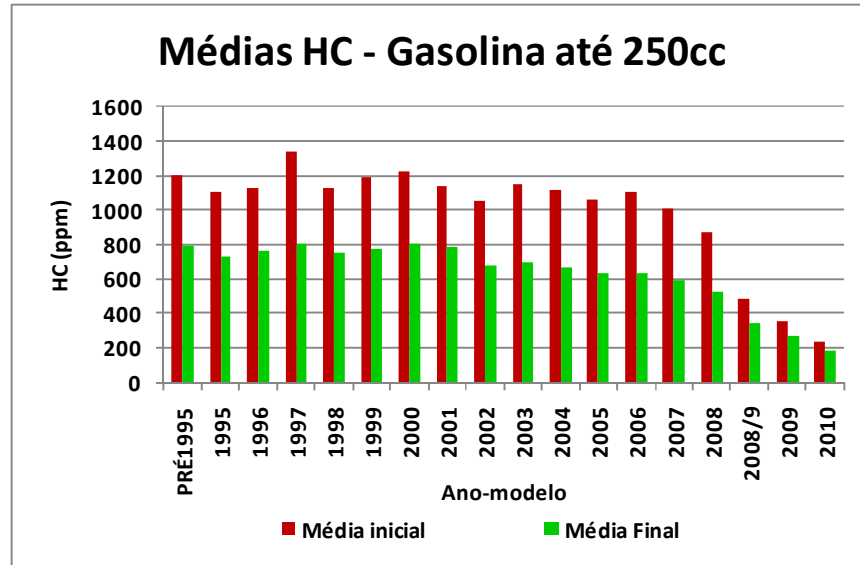
Médias CO - gasolina > 250cc



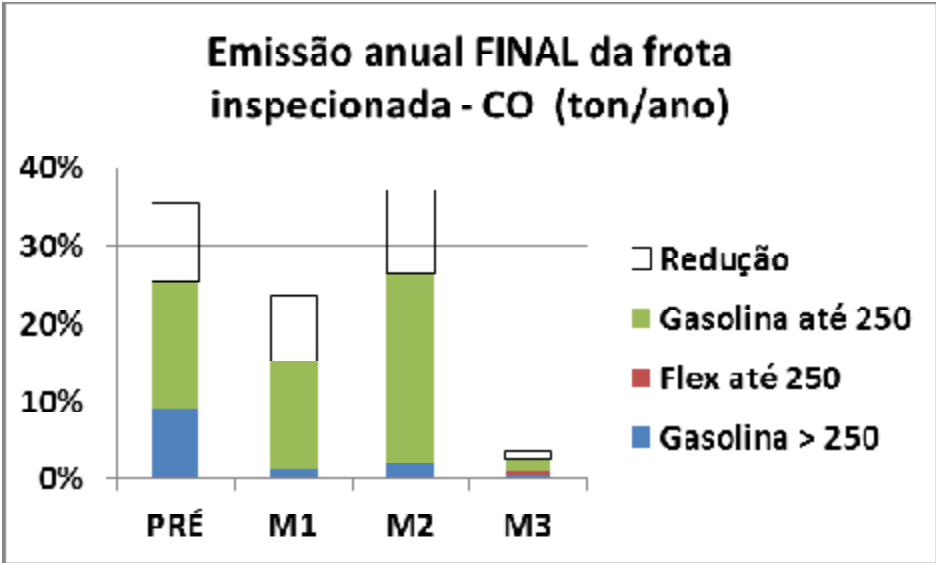
Médias CO - flex até 250cc



Emissões médias das motos - HC



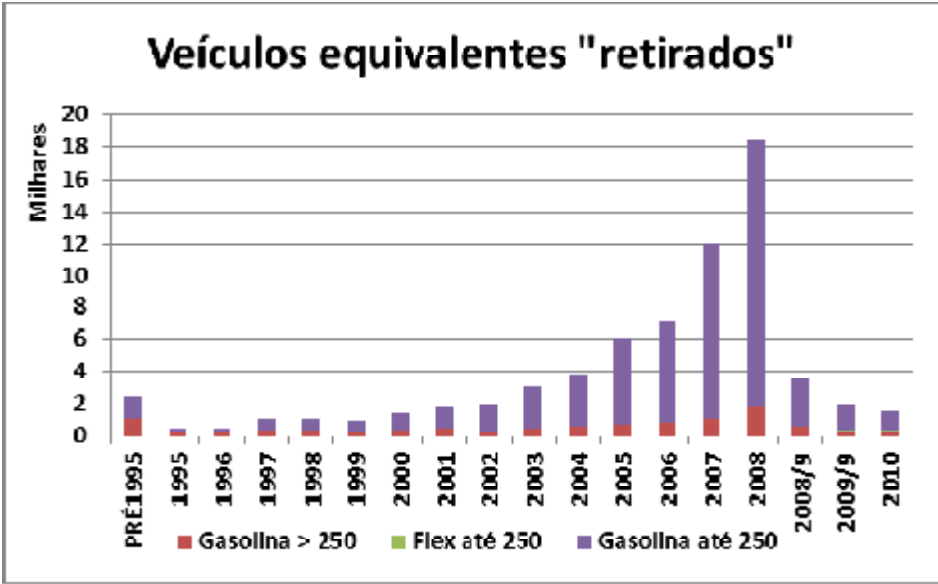
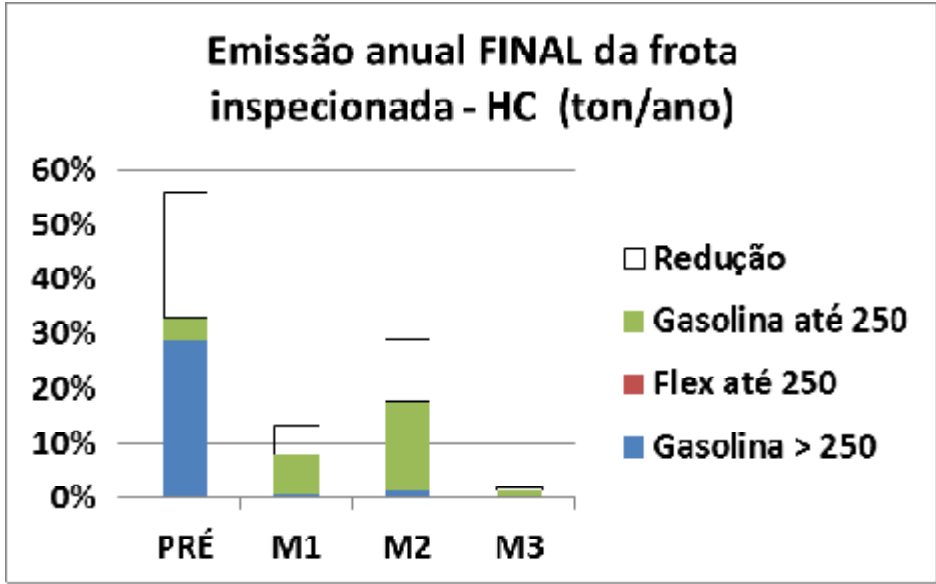
Impactos Ambientais – Motos



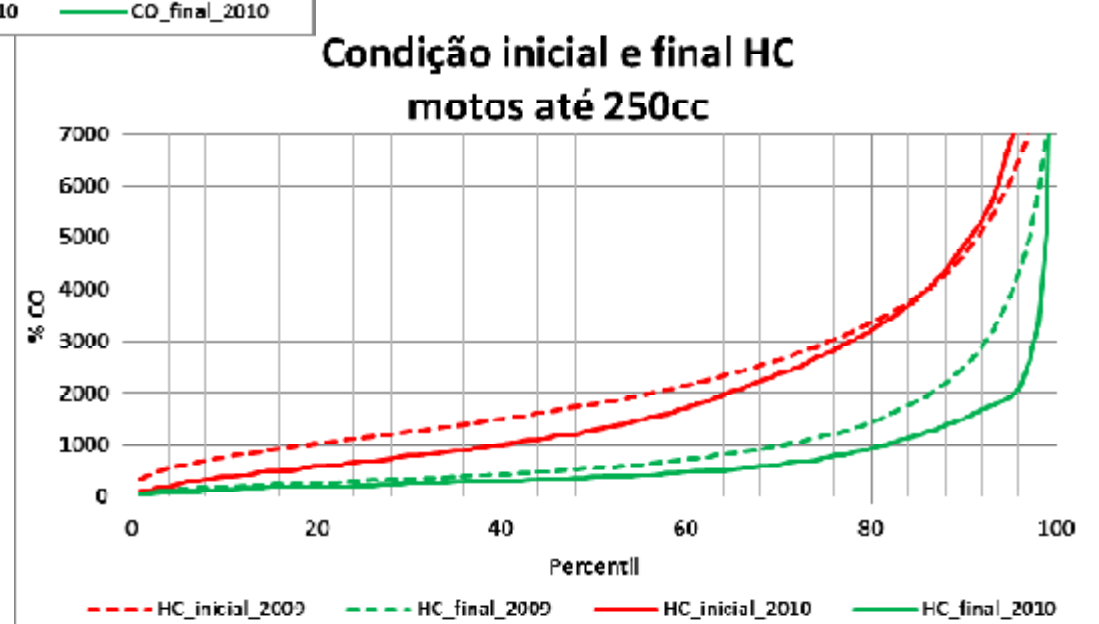
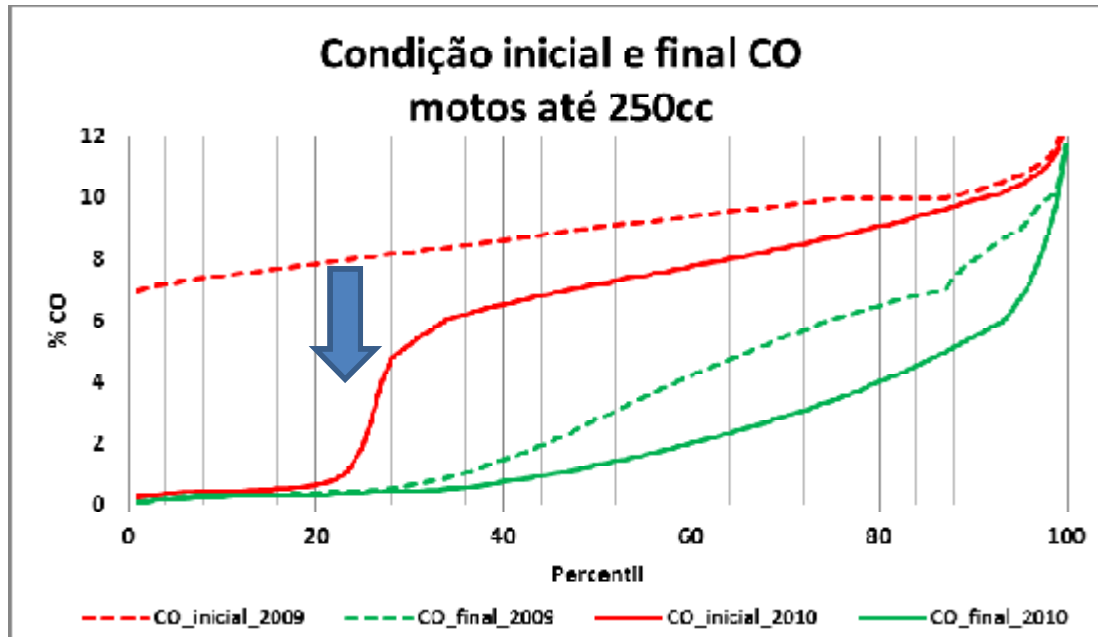
Frota inspecionada: 242.520

Benefício ambiental expresso em veículos equivalentes "retirados" de circulação:

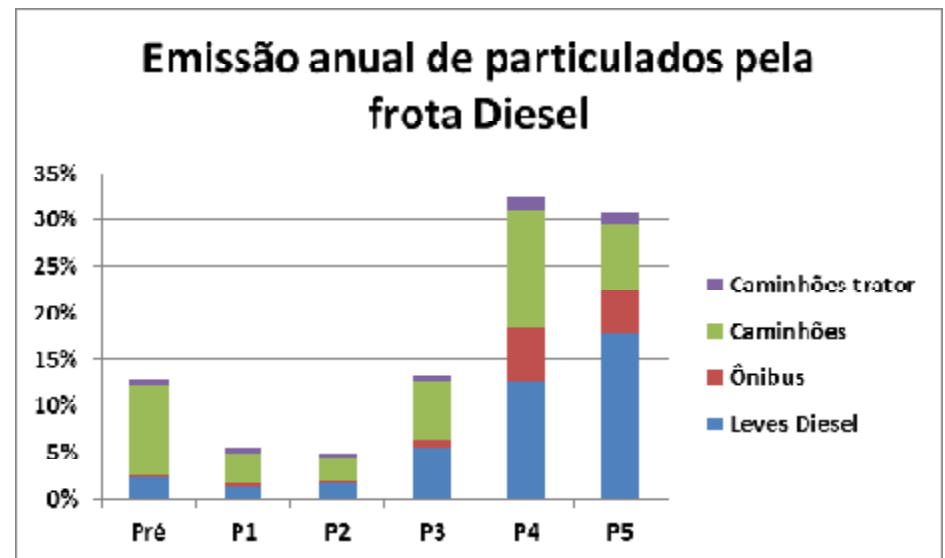
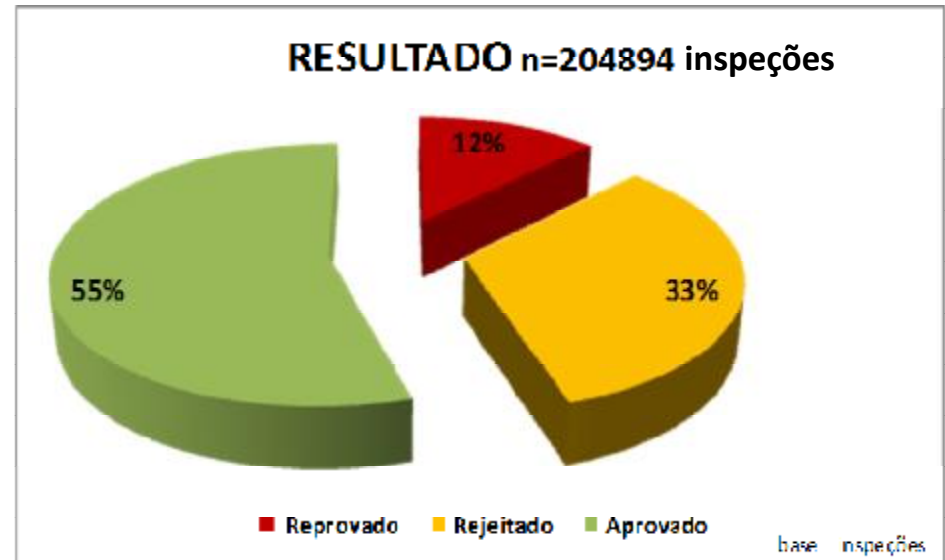
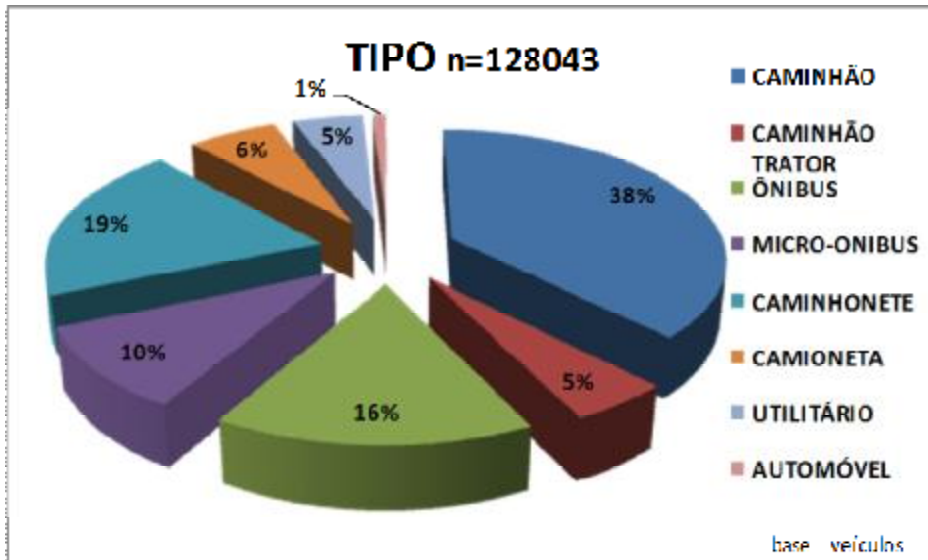
- **CO: 69.717 (benefício 30%)**
- **HC: 88.362 (benefício 40%)**



APRENDIZADO I/M-SP – Motos

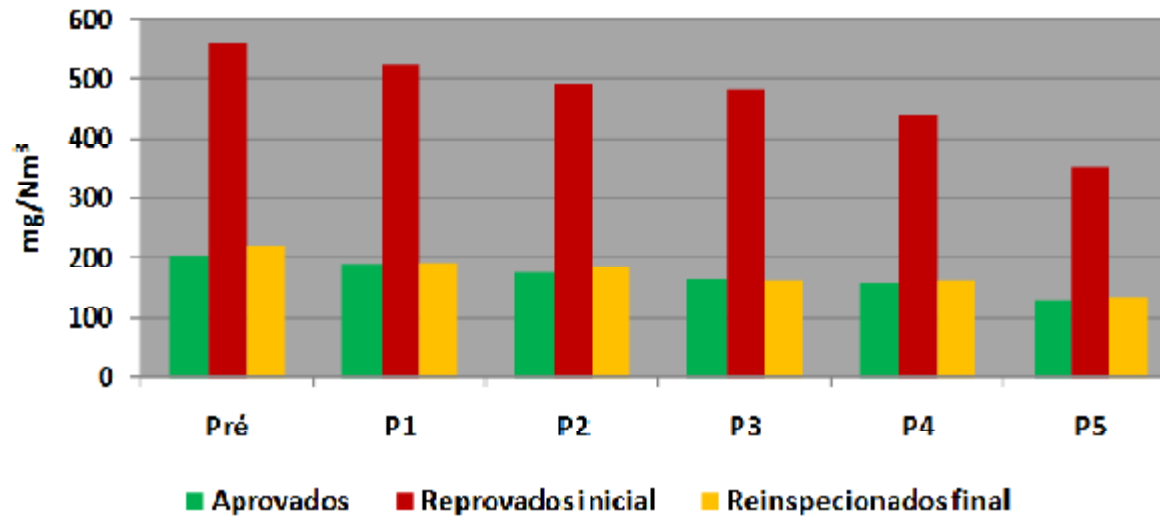


FROTA DIESEL INSPECIONADA I/M-SP

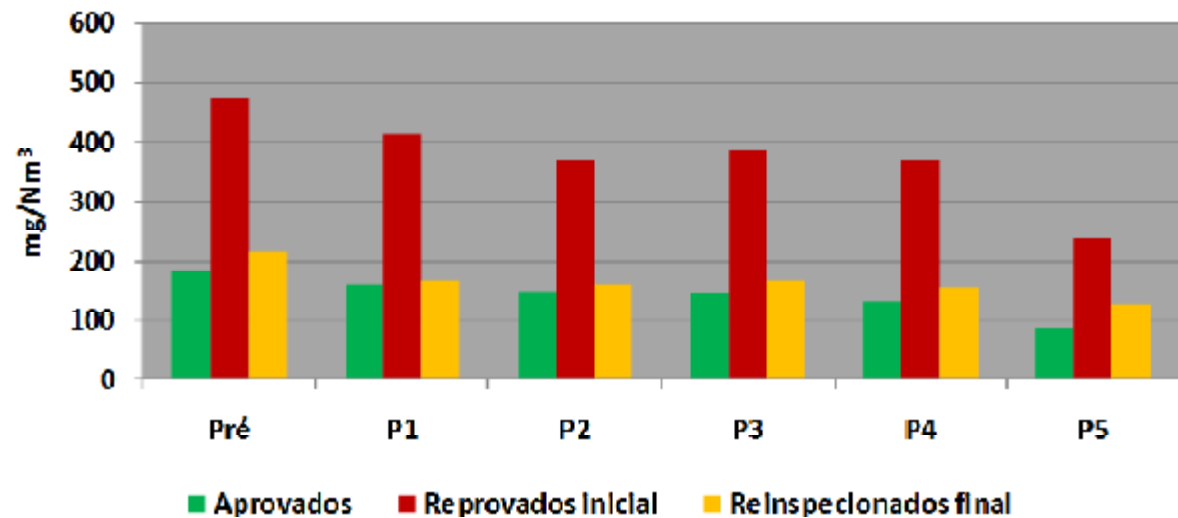


Concentração média de MP - 2010

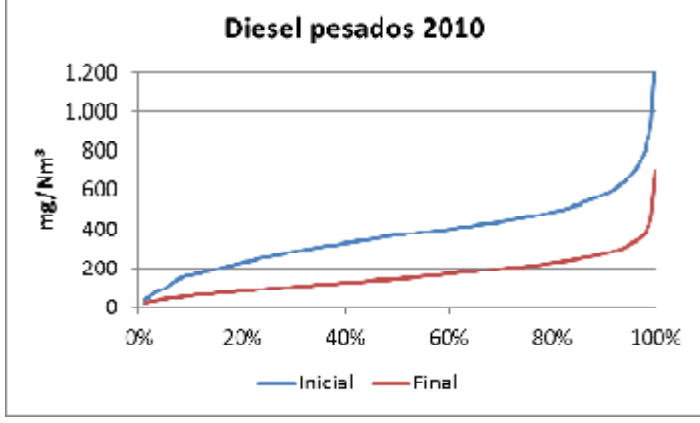
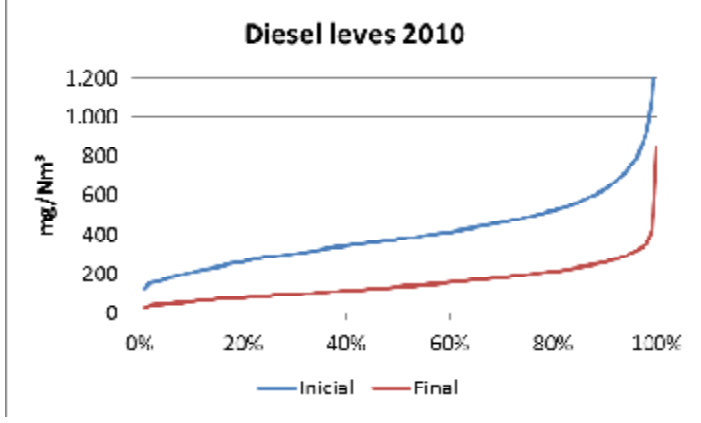
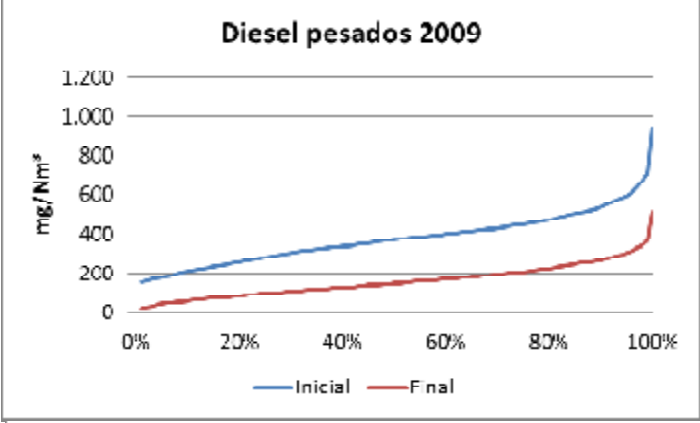
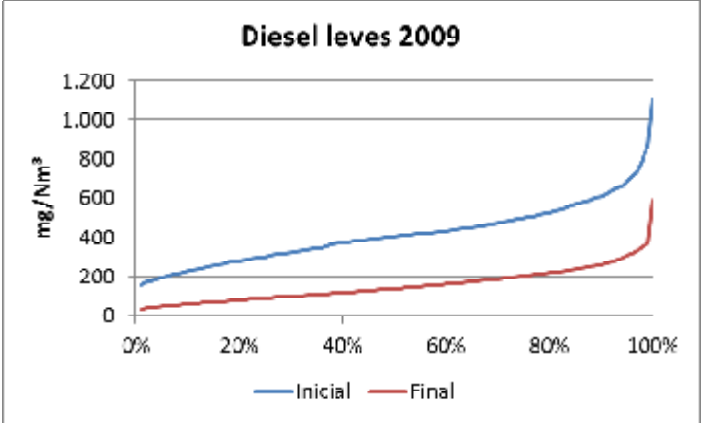
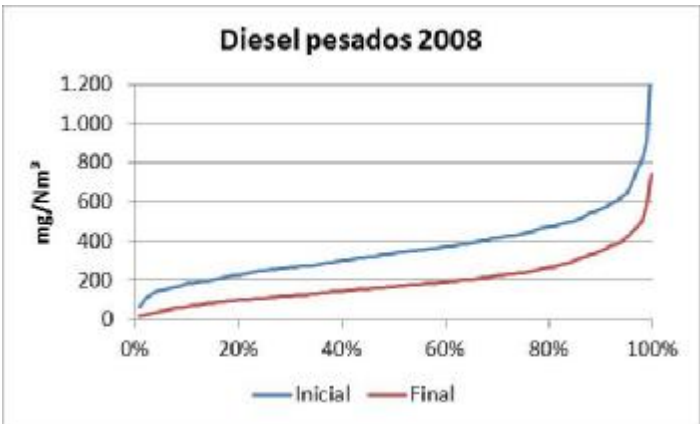
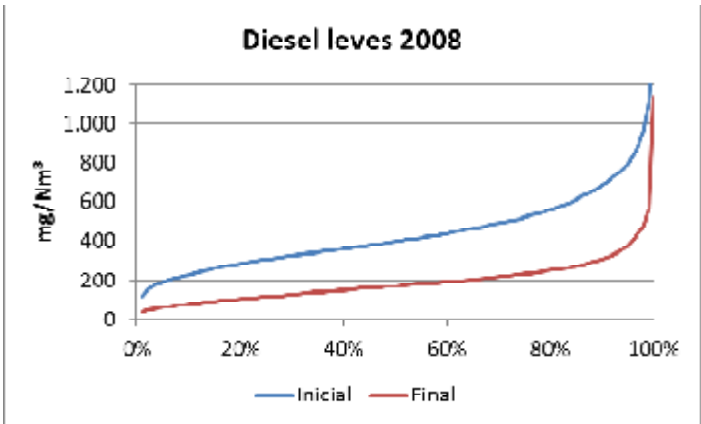
Emissões médias - diesel leves



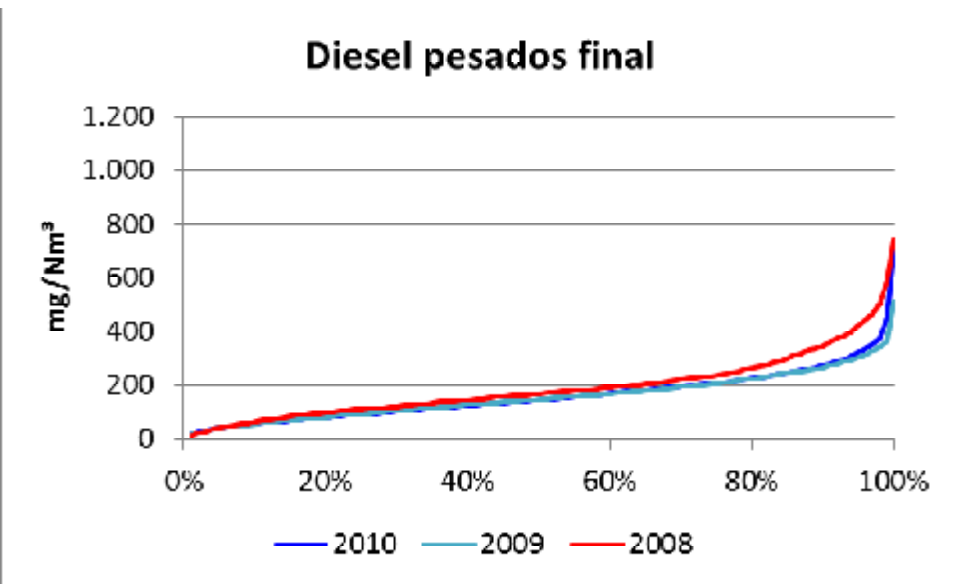
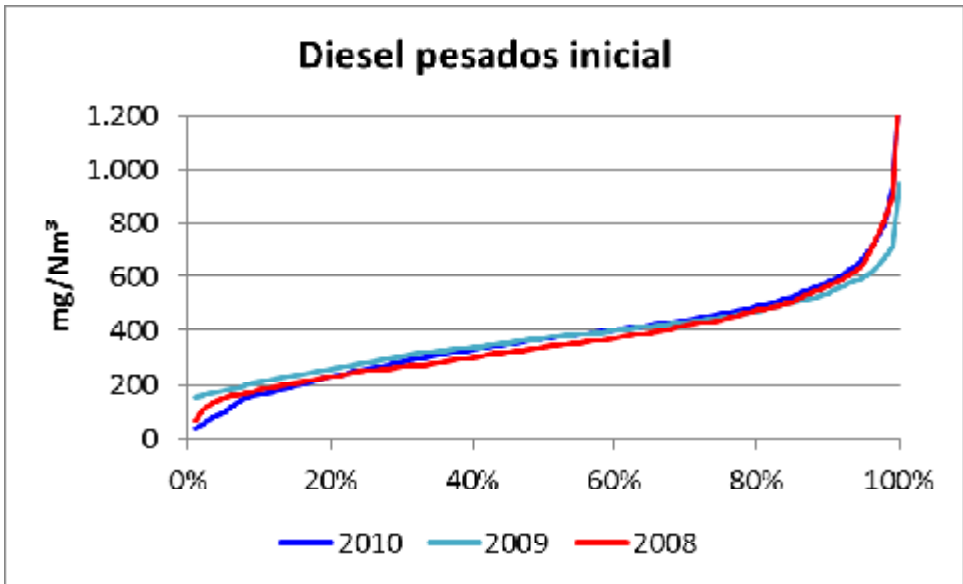
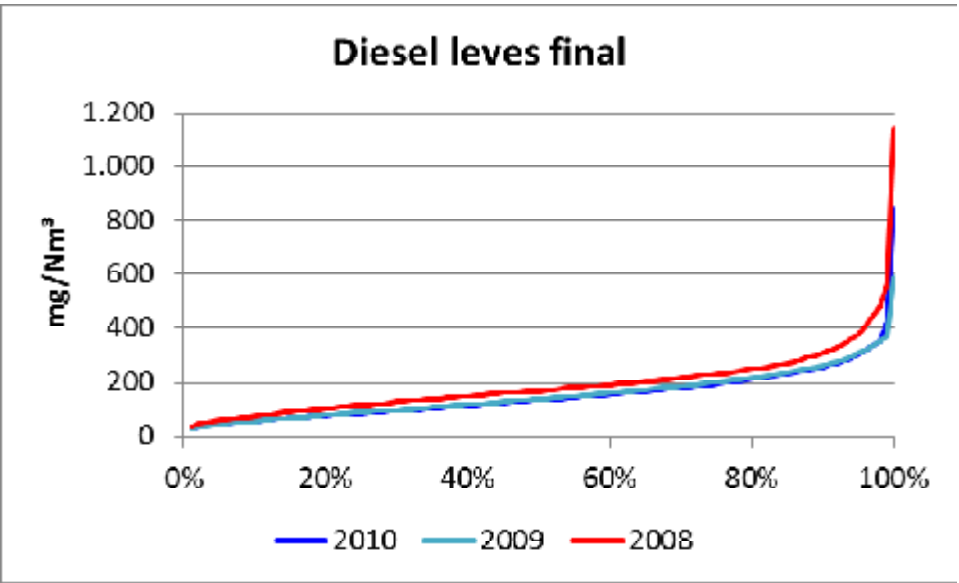
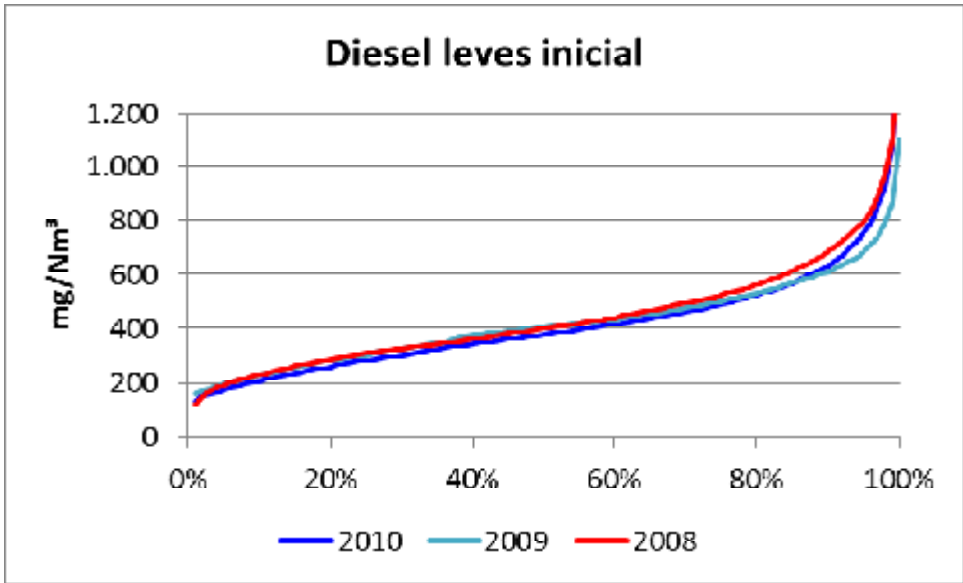
Emissões médias - diesel pesados



RESULTADOS DIESEL – I/M-SP

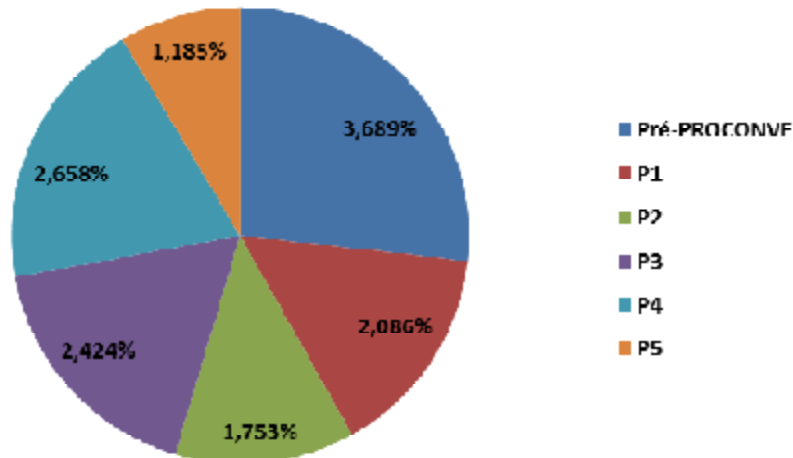


RESULTADOS DIESEL – I/M-SP

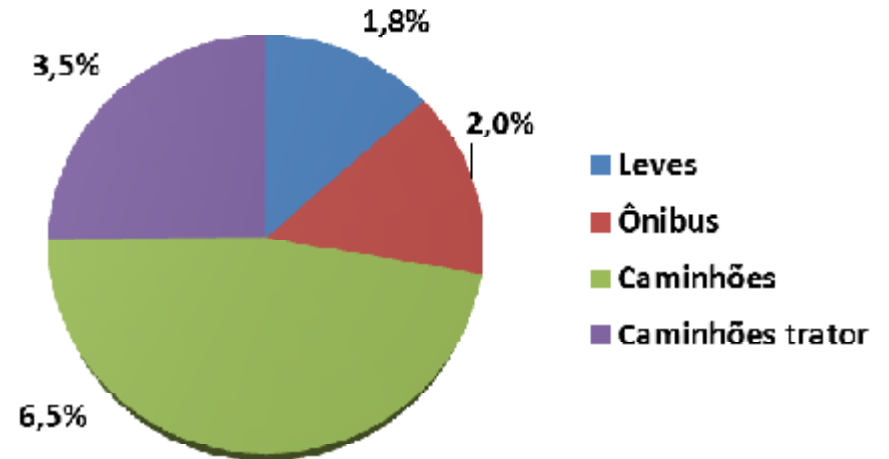


BENEFÍCIO FINAL I/M-SP Diesel

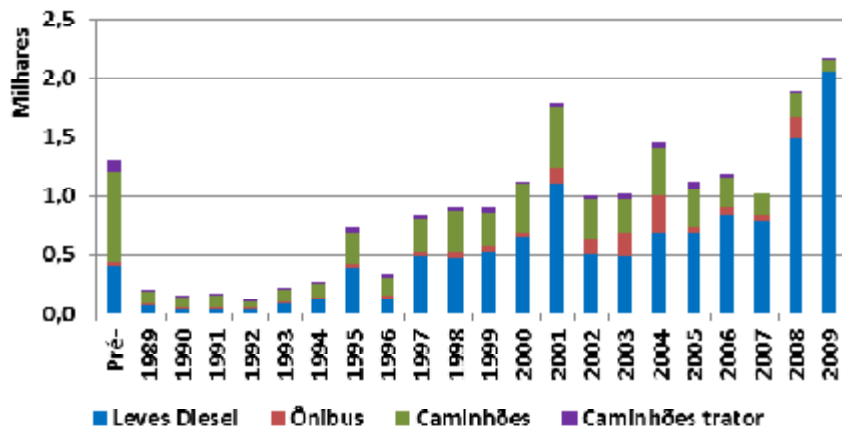
Benefício ambiental do I/M-SP - Diesel



Benefício ambiental do I/M-SP - Diesel



Veículos equivalentes "retirados"



- Frota registrada: 319.990 veículos;
- Frota circulante: 239.993 veículos (75%)
- Frota inspecionada: 121.426 veículos
- Veículos equivalentes: 19.945 veículos (13,8%)
- Percentual da frota circulante: 7%



**Instituto Nacional de Análise Integrada
de Risco Ambiental
CNPq - FAPESP**

**Estimativa dos efeitos à saúde
do programa de inspeção veicular
na Cidade de São Paulo**



Environmental Health, Energy, and Transportation: Bringing Health to the Fuel Mixture
Sponsored by
The Institute of Medicine's Roundtable on Environmental Health Sciences,
Research, and Medicine

Nov 29-30, 2007
National Academy of Sciences
2100 Constitution Ave, NW
Washington, D.C

Goal:

This workshop will address the potential environmental and public health consequences of transport fuel production and use. It will focus on the unintended consequences of previous changes to fuel mixtures, and examine possibilities for new fuel sources and mixtures. The workshop will explore the costs and benefits of potential fuel mixtures for the United States, with an emphasis on health, sustainability, environmental and public health consequences.

www.iom.edu/ehsrt



Statement on the health co-benefits of policies to tackle climate change

- The improvement of health both locally and globally should be one of the main criteria motivating climate change mitigation measures. The potential health co-benefits and harms should be considered when making choices about mitigation policies.
- The health co-benefits of climate change mitigation should be given greater prominence in international negotiations, for example through dedicated sessions on this topic.
- Health Ministers and ministries should actively engage in promoting mitigation strategies that result in health co-benefits in their own country and should make the case for such strategies to their national climate change negotiators in advance of international meetings.
- Health policymakers, scientists, health professionals and industry should reach beyond national and disciplinary boundaries to collaborate with each other to study, develop and implement climate change mitigation measures that also benefit health.
- The health community must provide leadership by reducing the emissions from health systems.



Paulo Hilário Nascimento Saldiva (coordenador) - USP/SP

Thais Mauad (vice-coordenador) – USP/SP

Alfésio Braga - USP/SP

Cláudia Rhoden – UFCSPA/RS

Elaine Costa - USP/SP

Guilherme Neto – MS/DF

Luiz Freitas – FIOCRUZ/BA

Maria de Fatima Andrade – USP/SP

Marisa Dolhnikoff - USP/SP

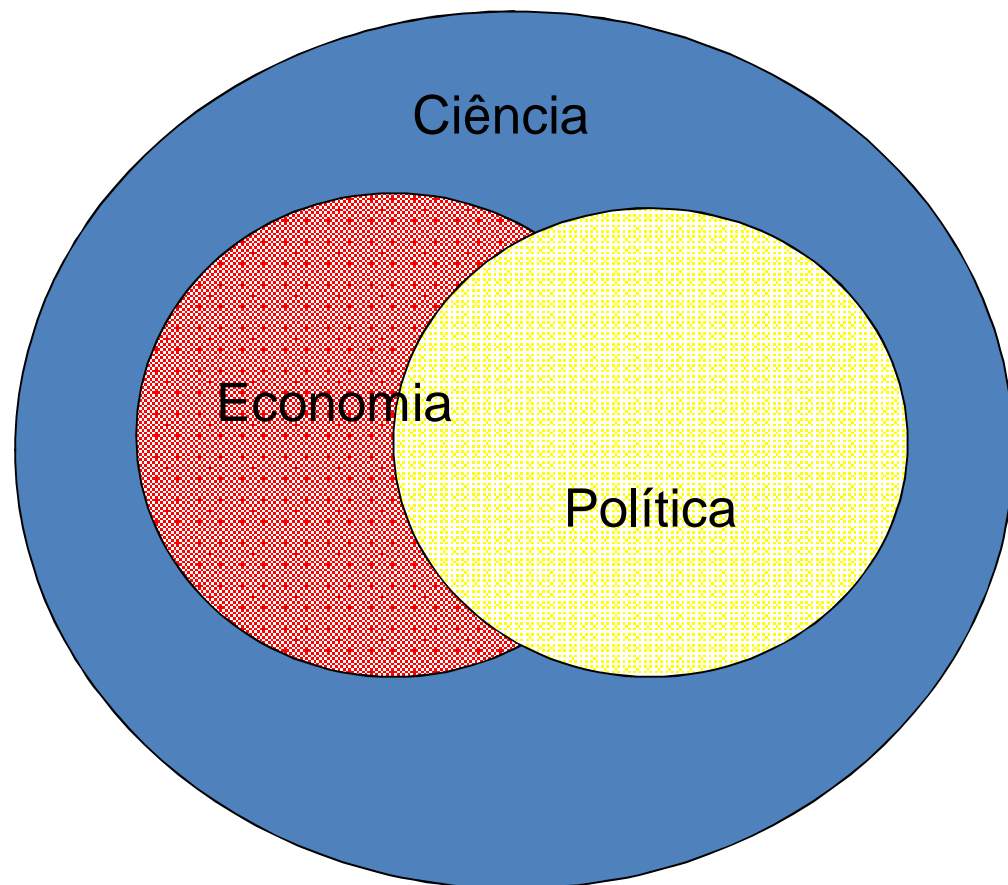
Rossana Francisco - USP/SP

Sandra Farsky - USP/SP

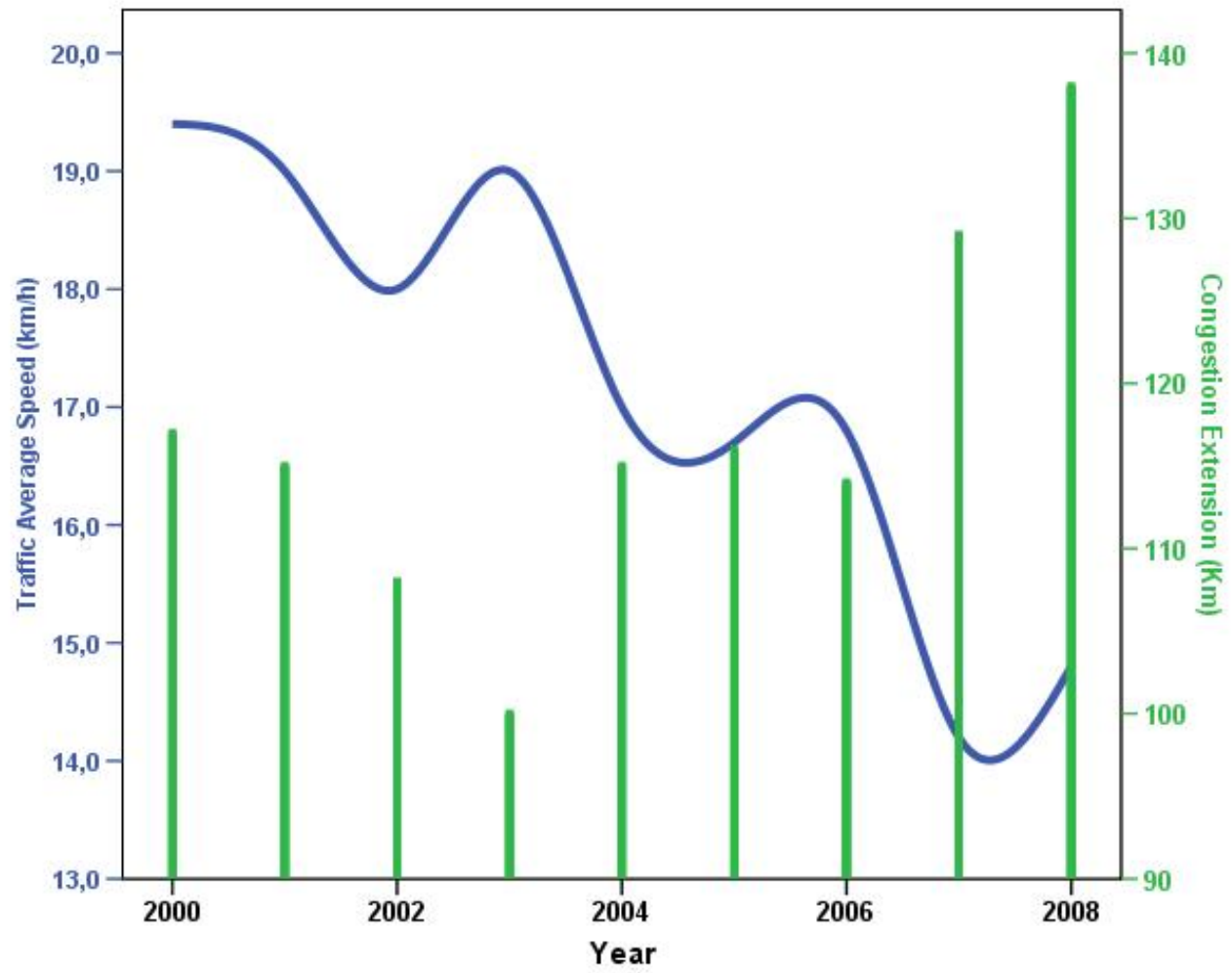
Sandra Vieira - USP/SP

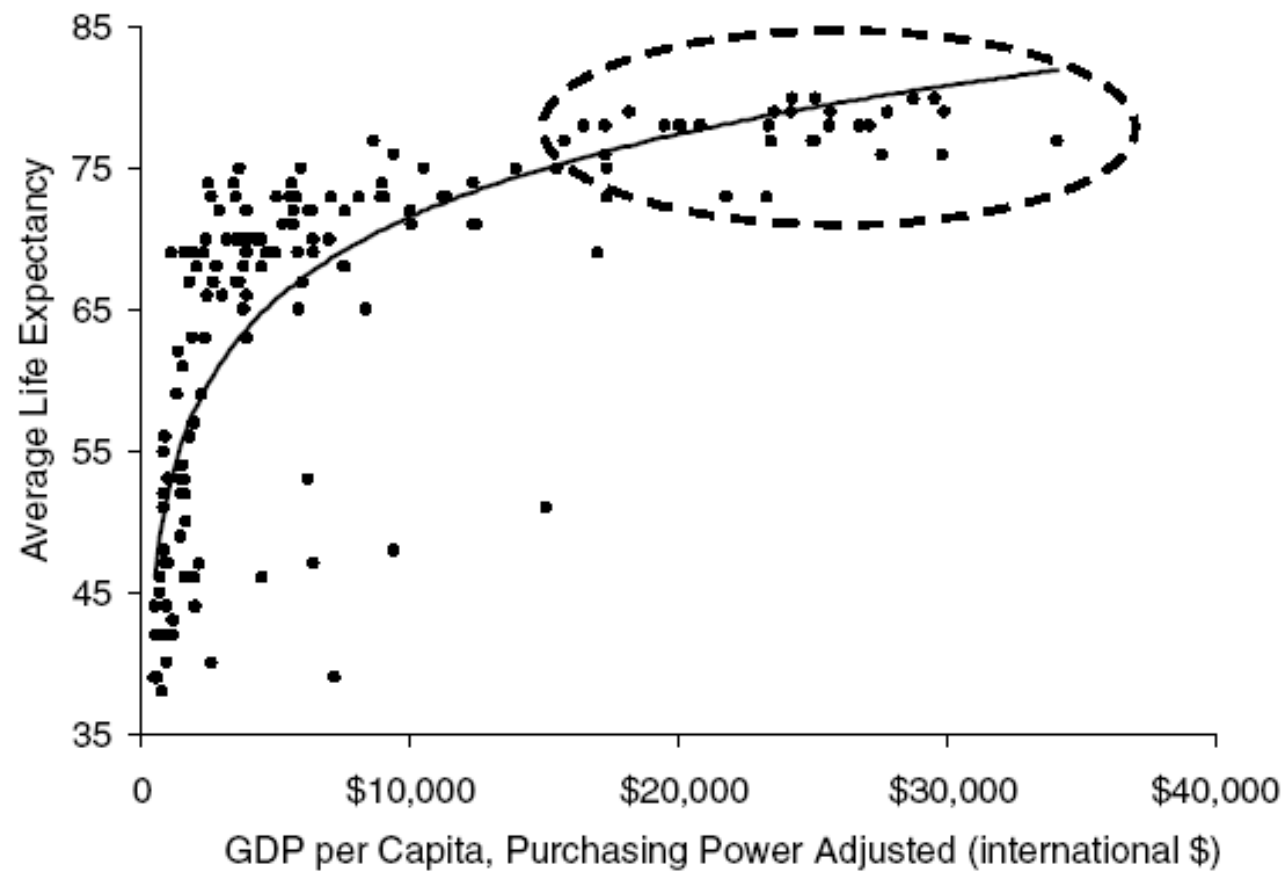
Tania Tavares – UFBA/BA

Ubiratan Santos - USP/SP



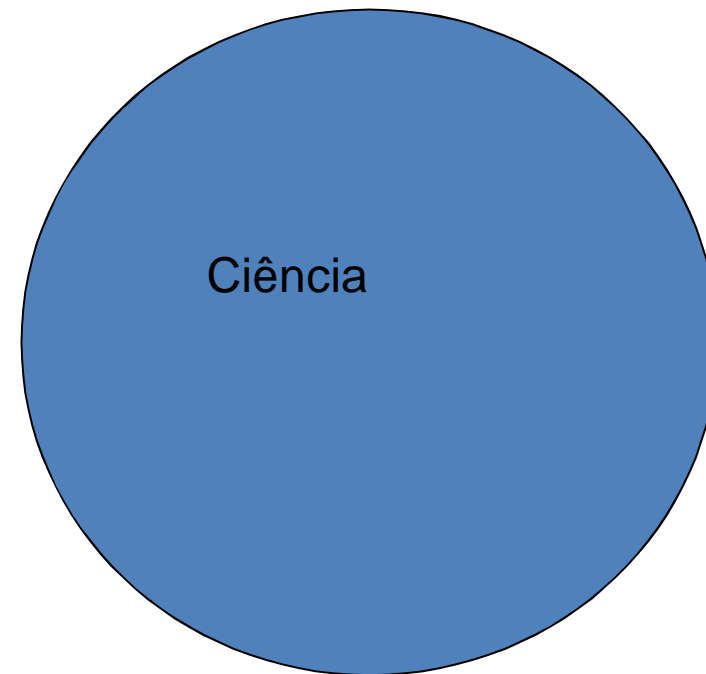
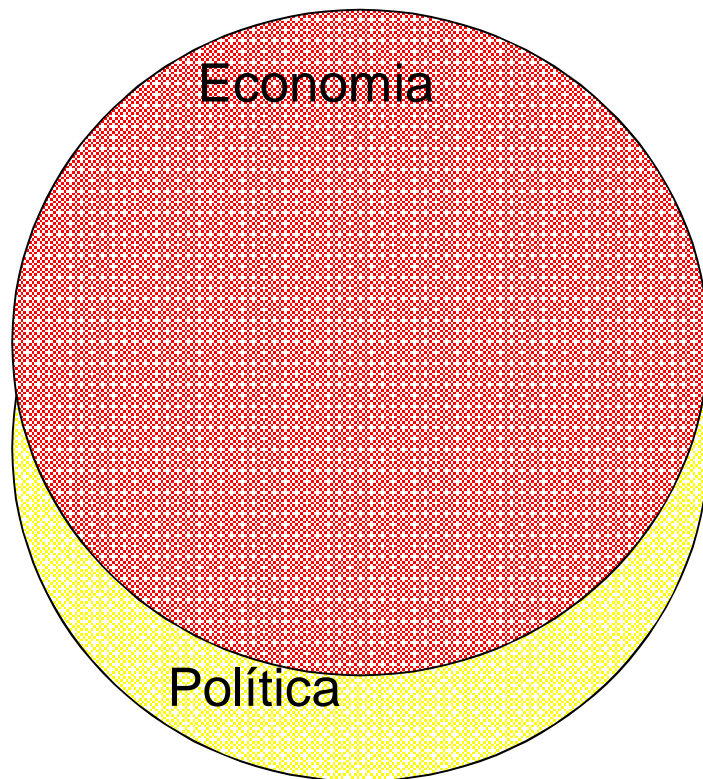


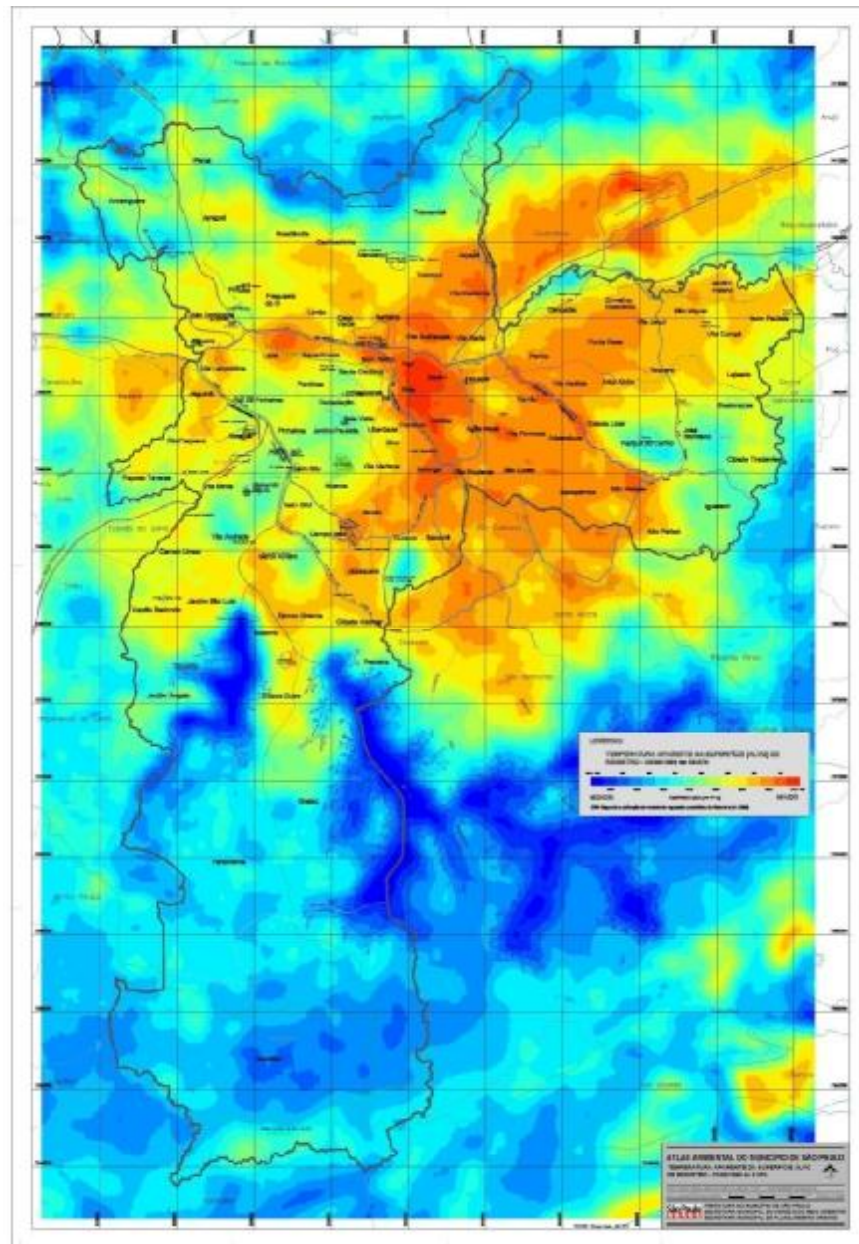




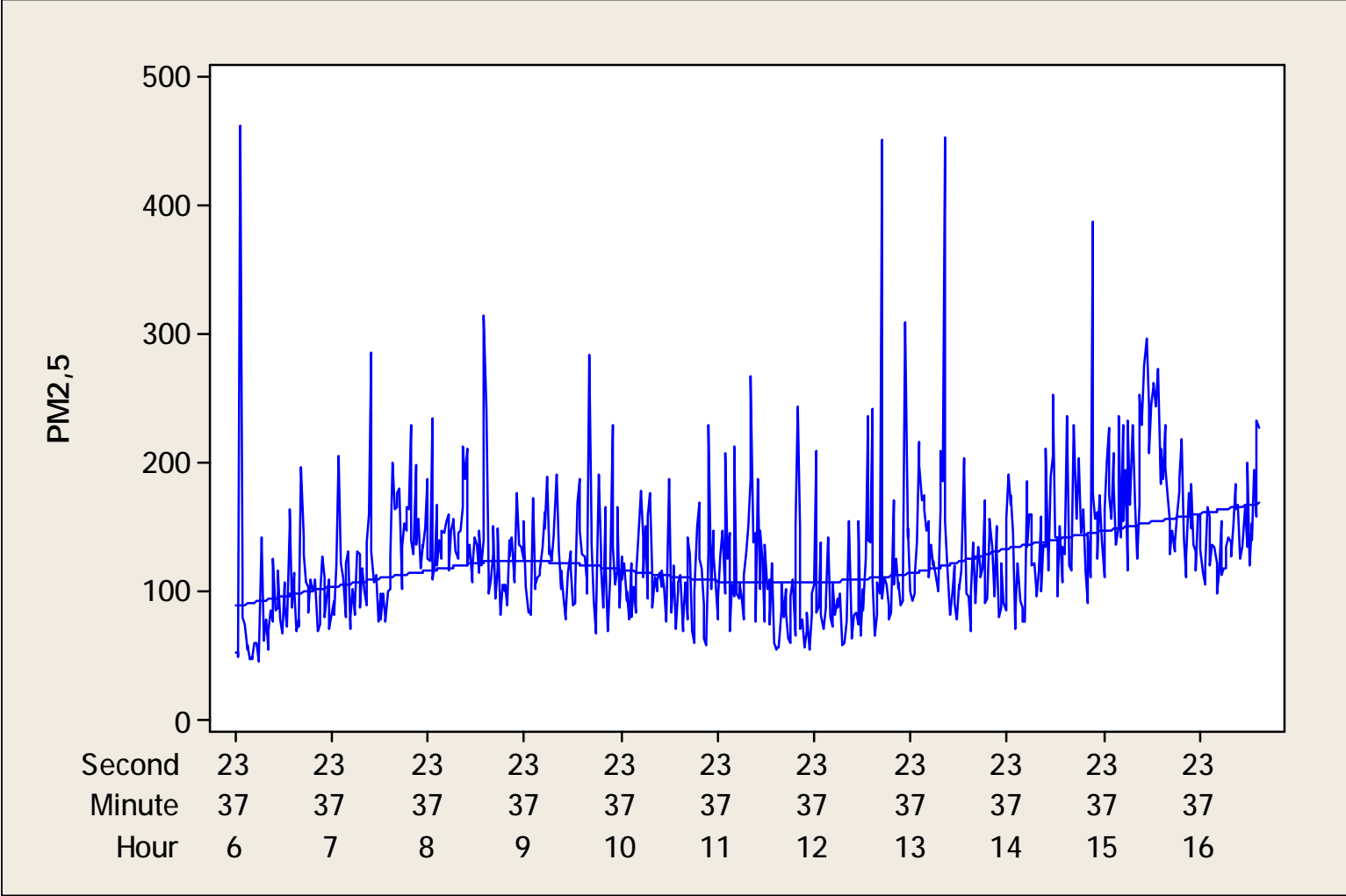
Note: Because of its very high GDP, Luxembourg was excluded to simplify the visual presentation (life expectancy = 77, GDP = \$50,061).

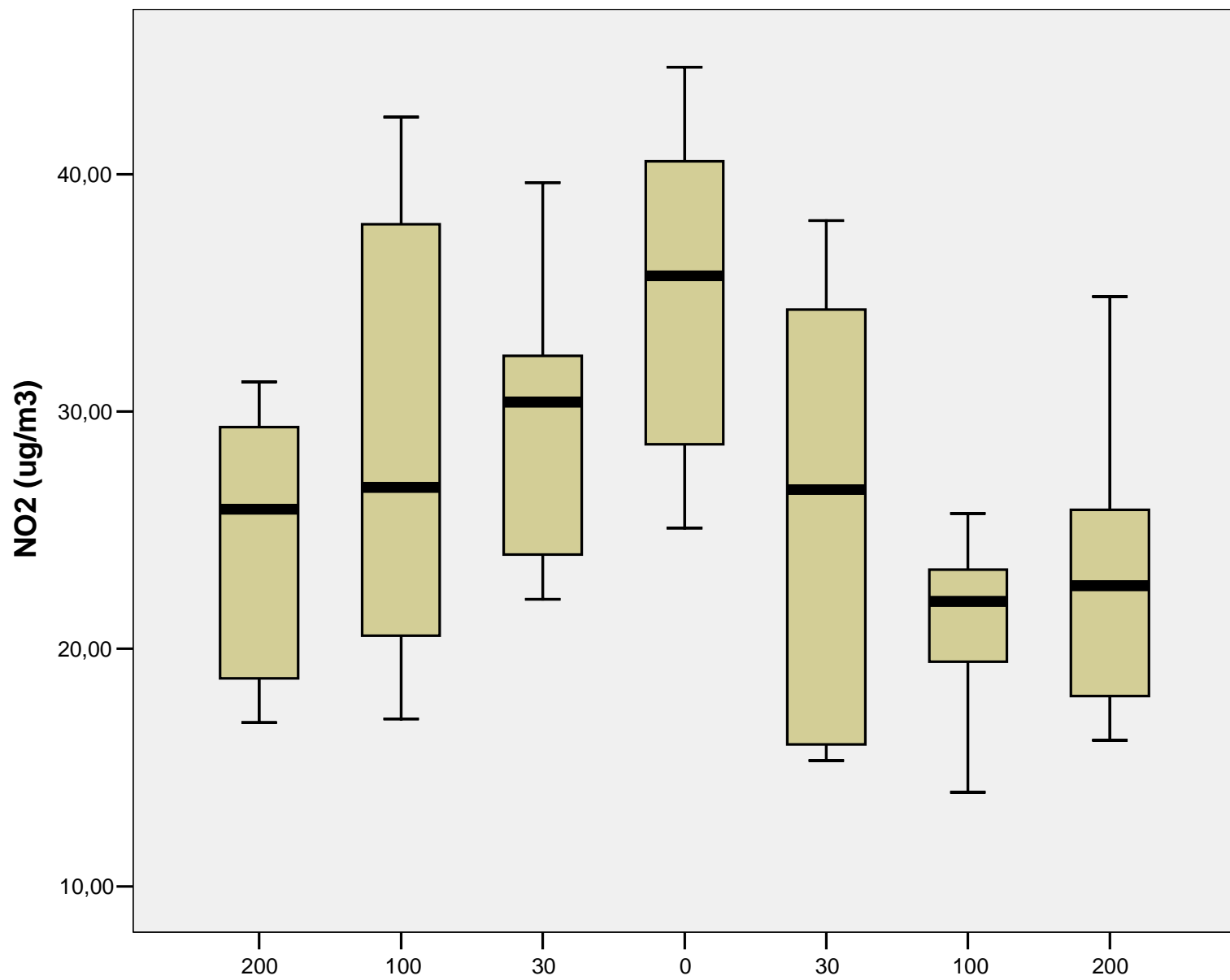
Source: World Bank 2002.

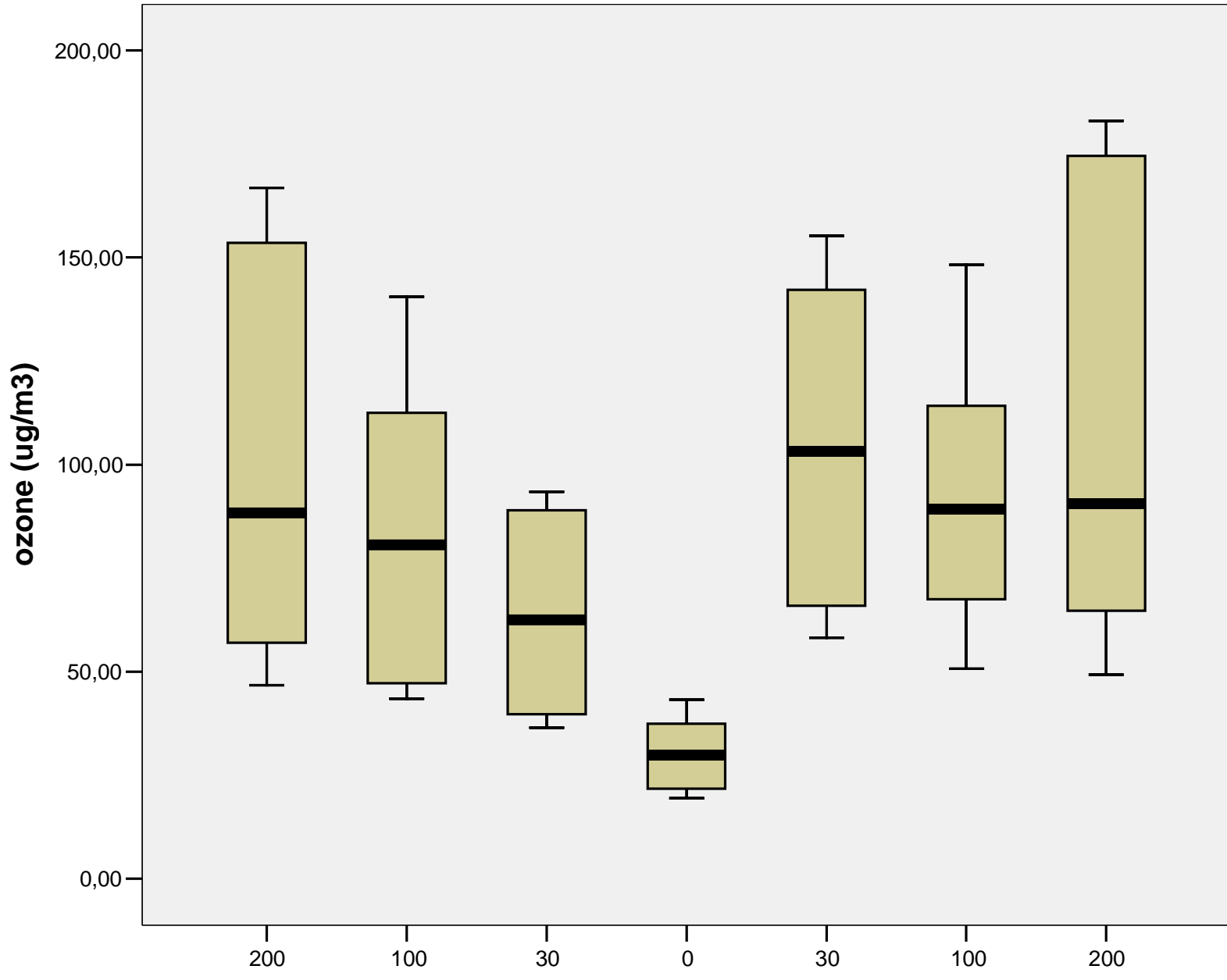


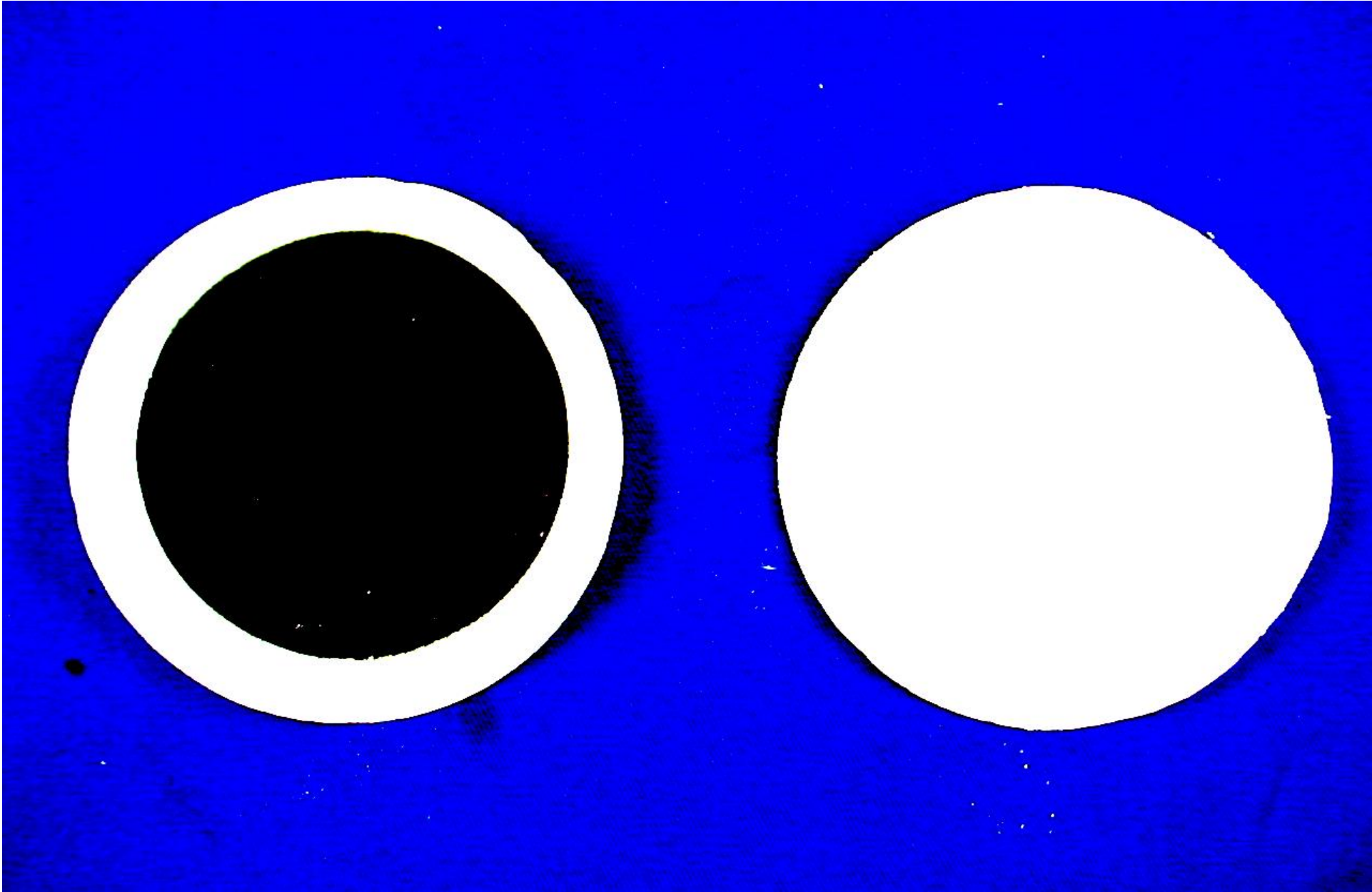


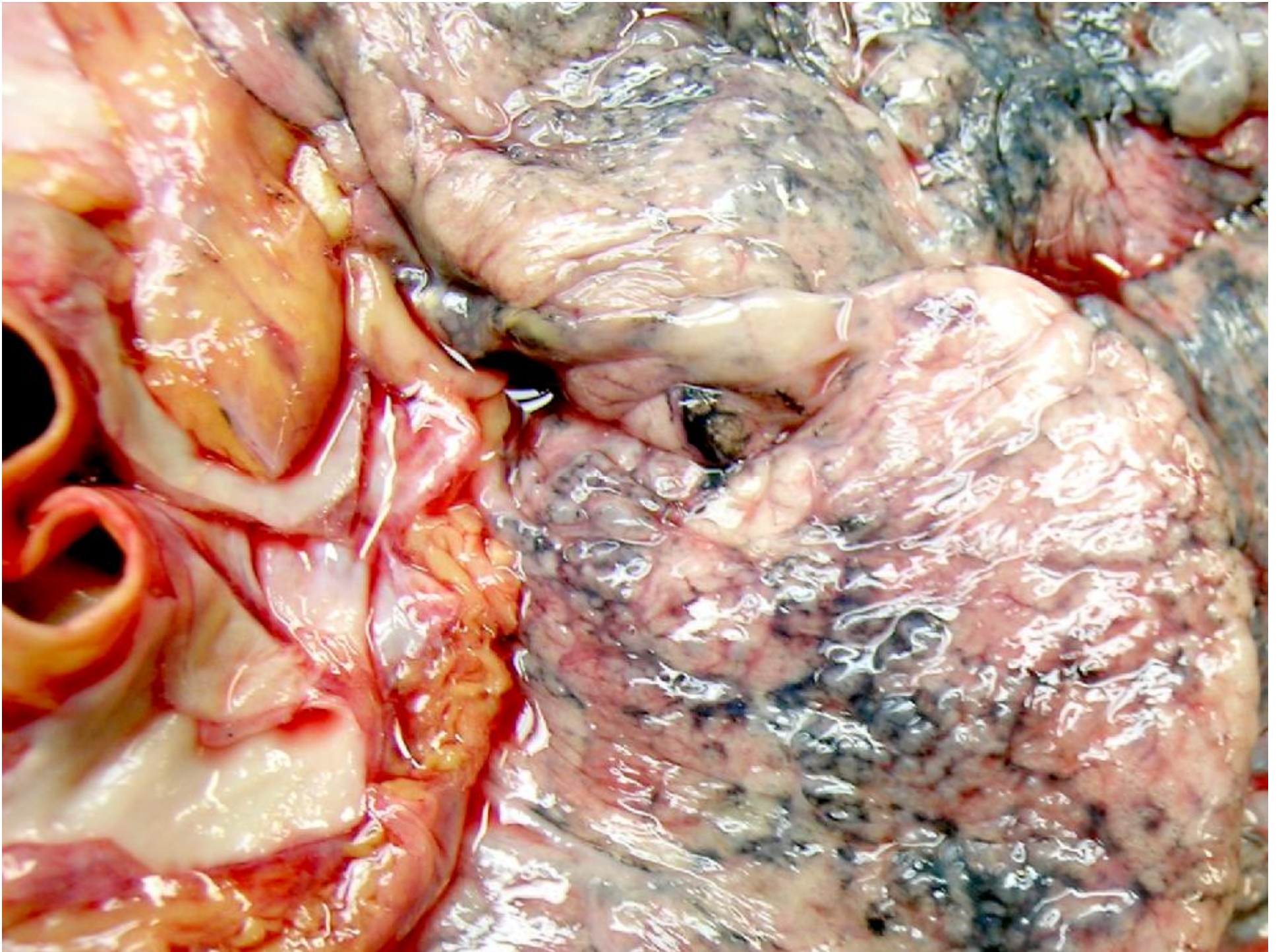


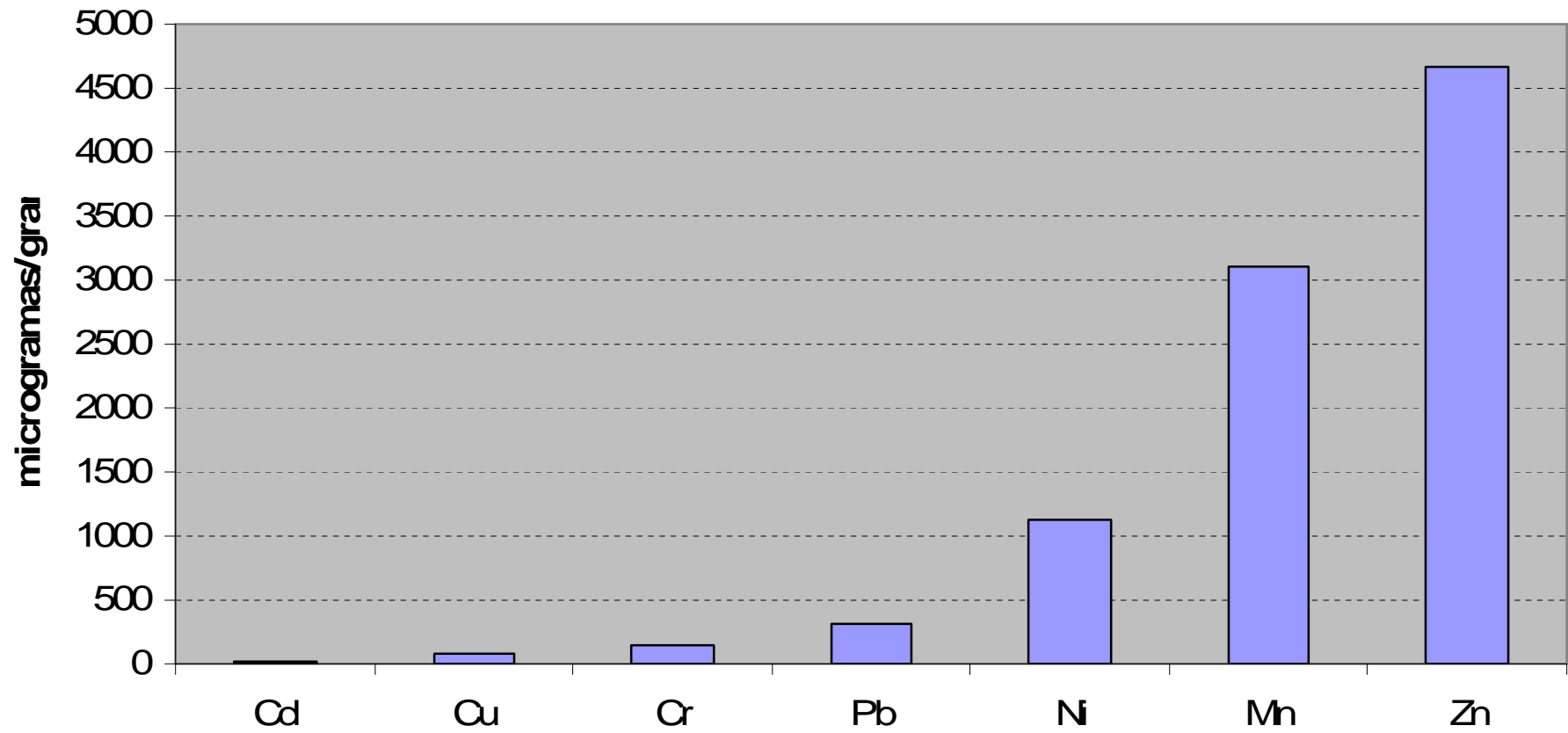


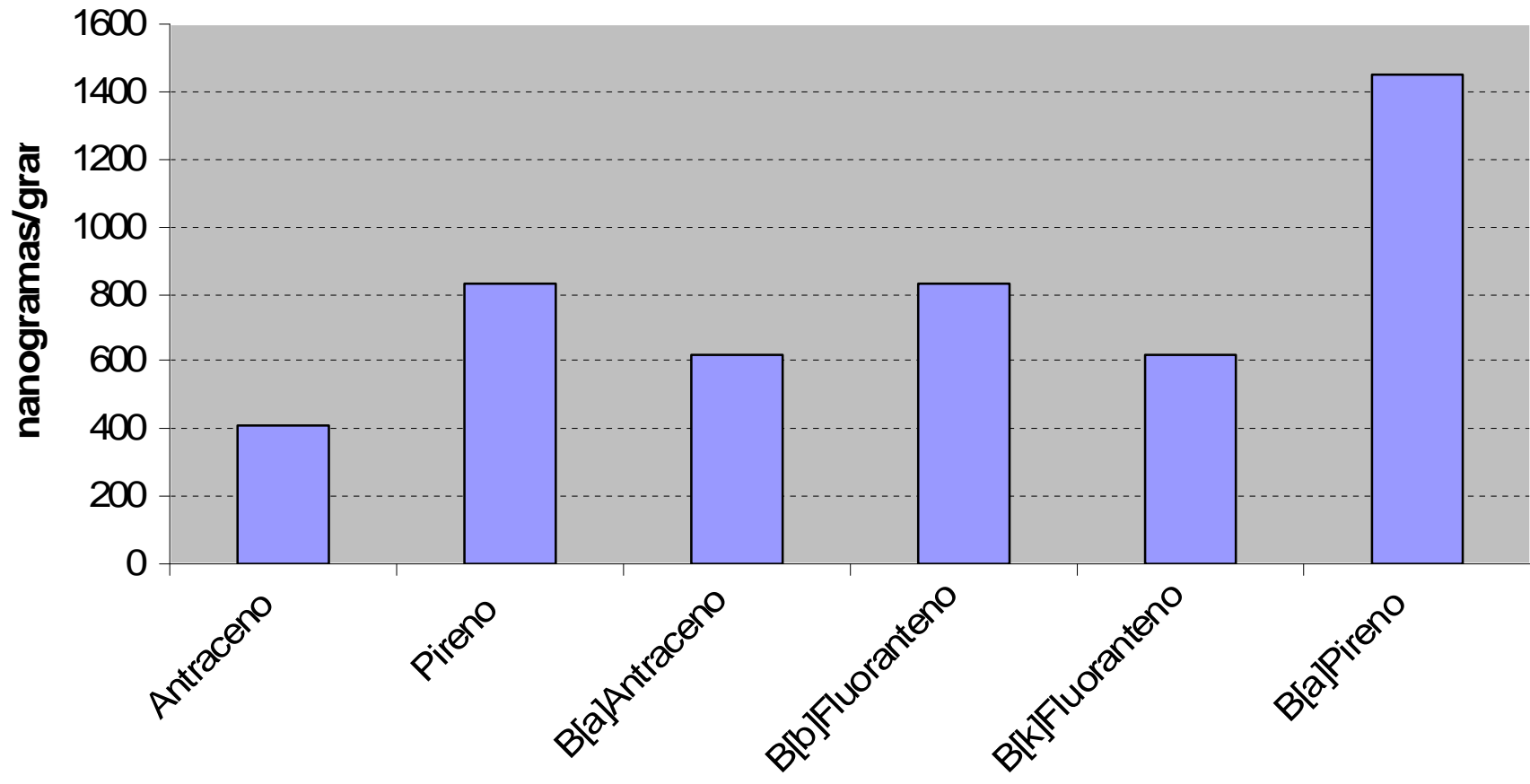






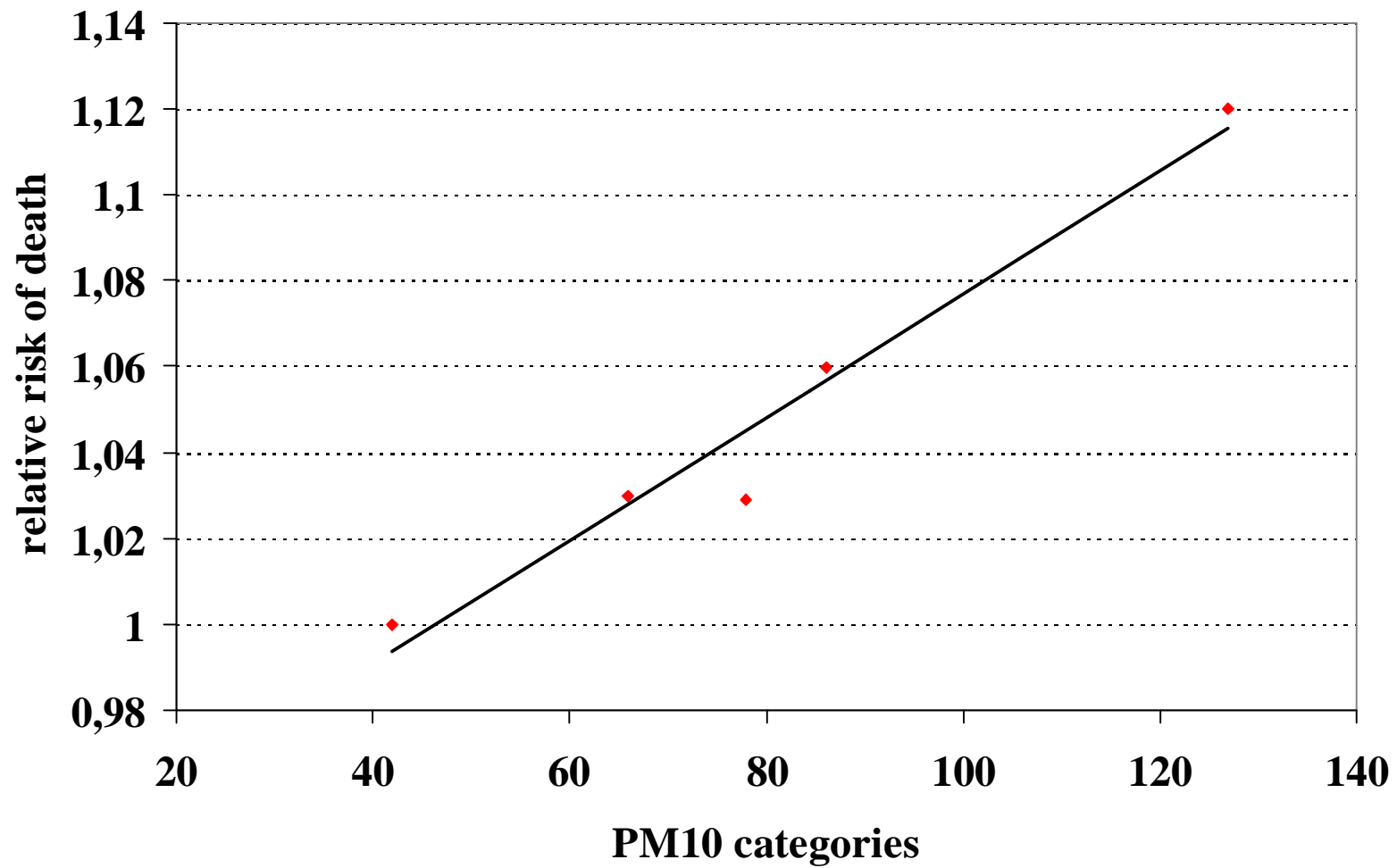




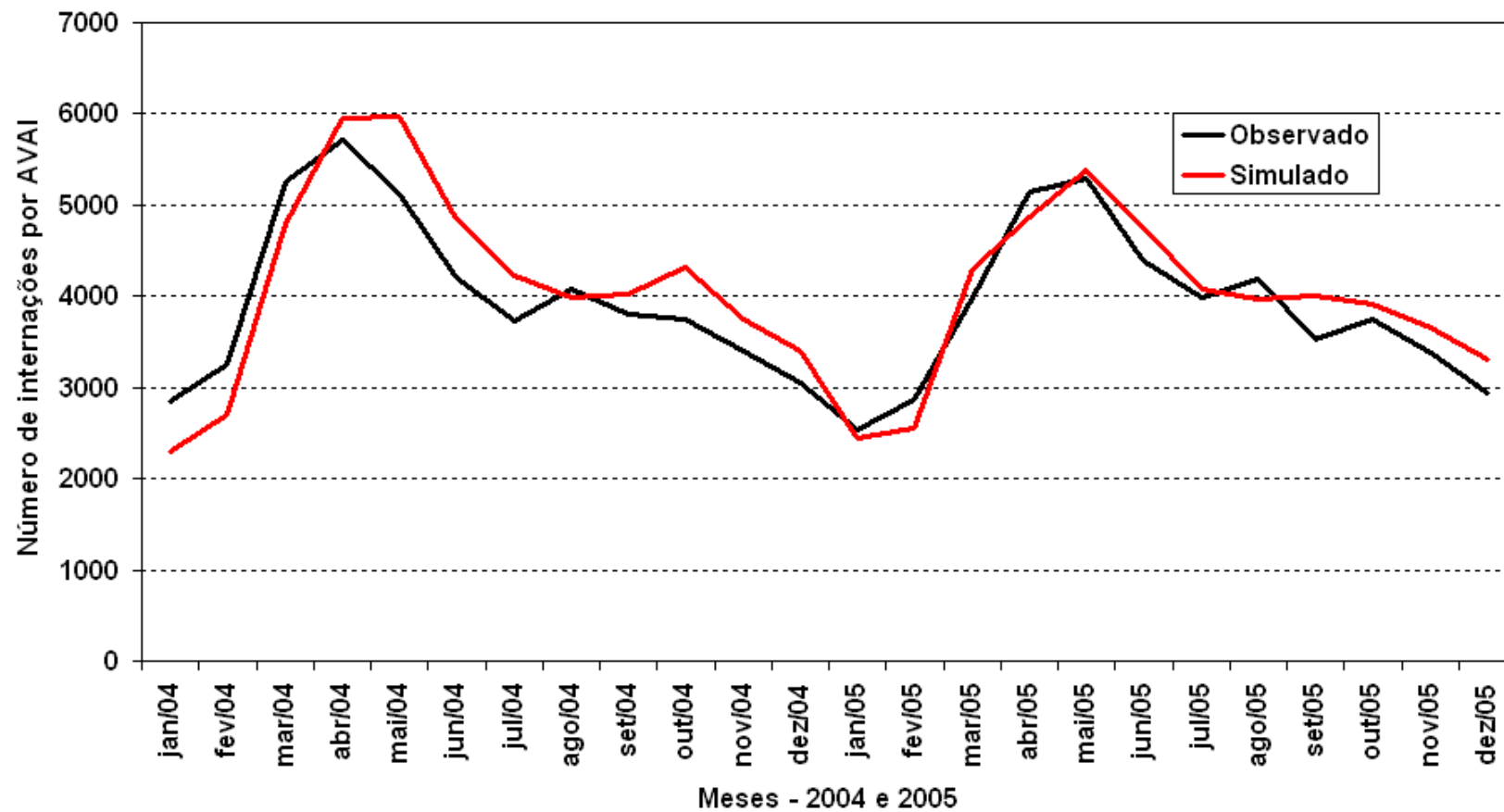


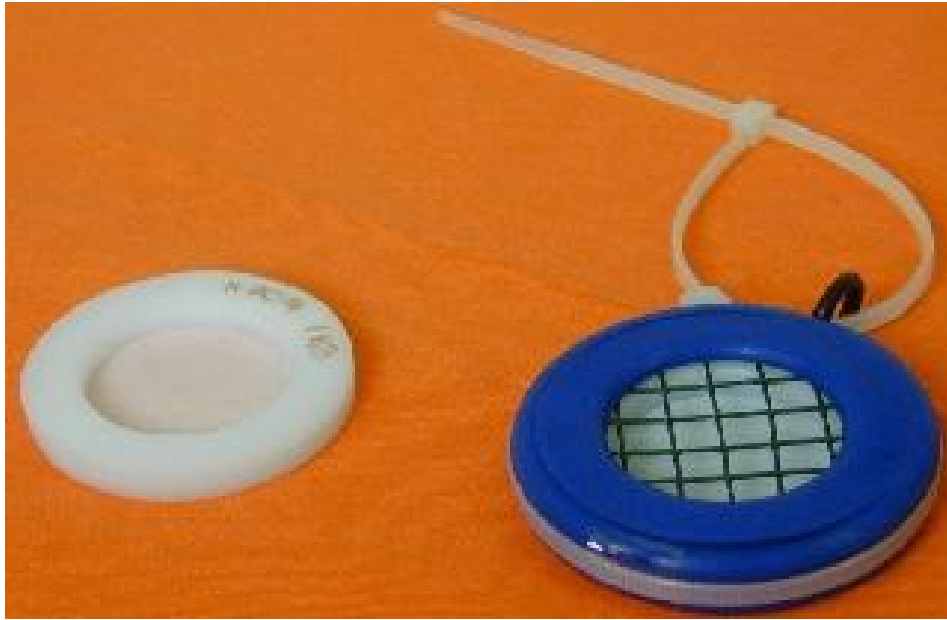
São Paulo – 28 µg/m³

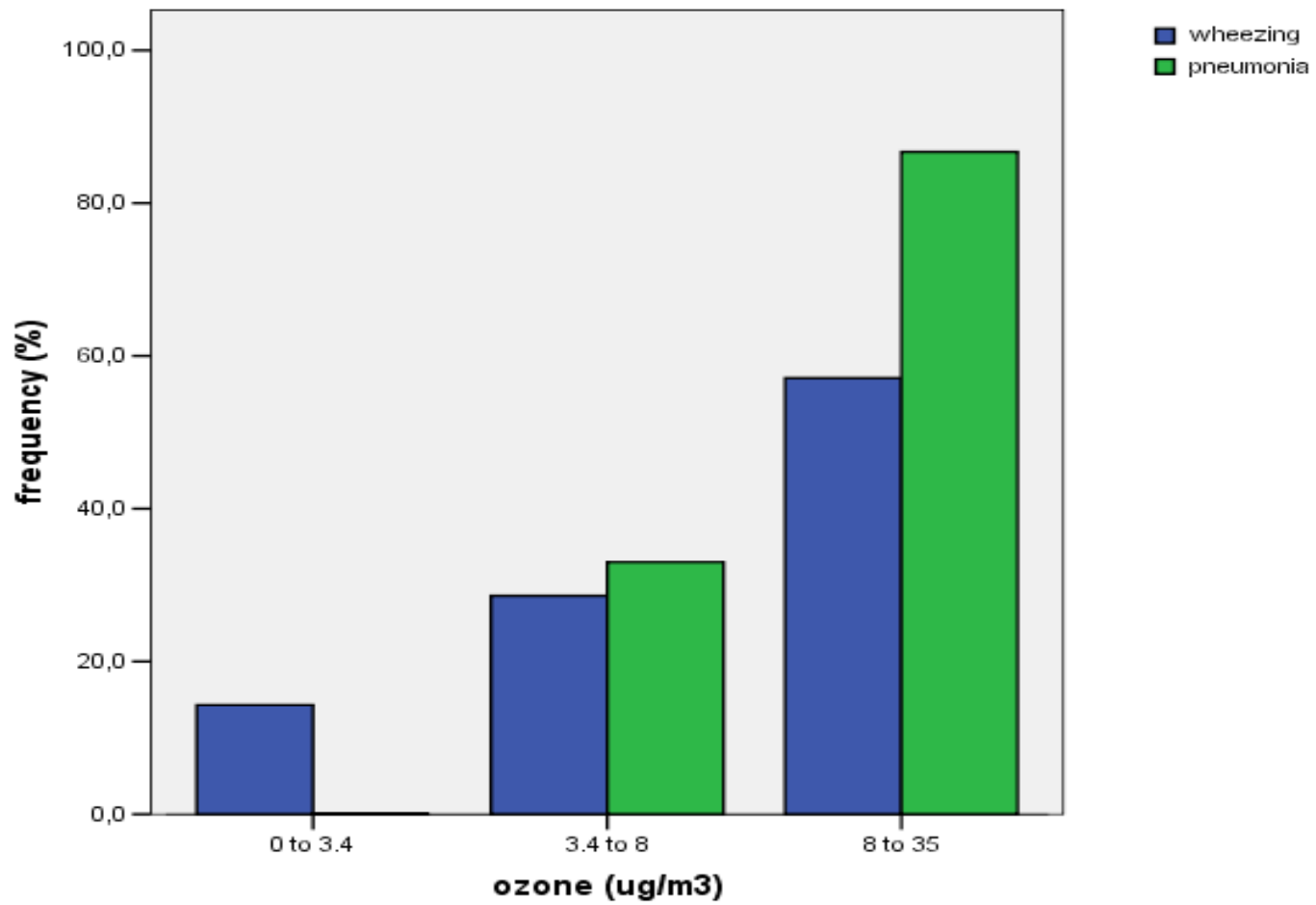
	ug/m3	%	
Fator 1	2.43	8.58	Solo
Fator 2	7.01	24.72	Óleo
Fator 3	3.87	13.66	Leve
Fator 4	10.90	38.45	Pesado

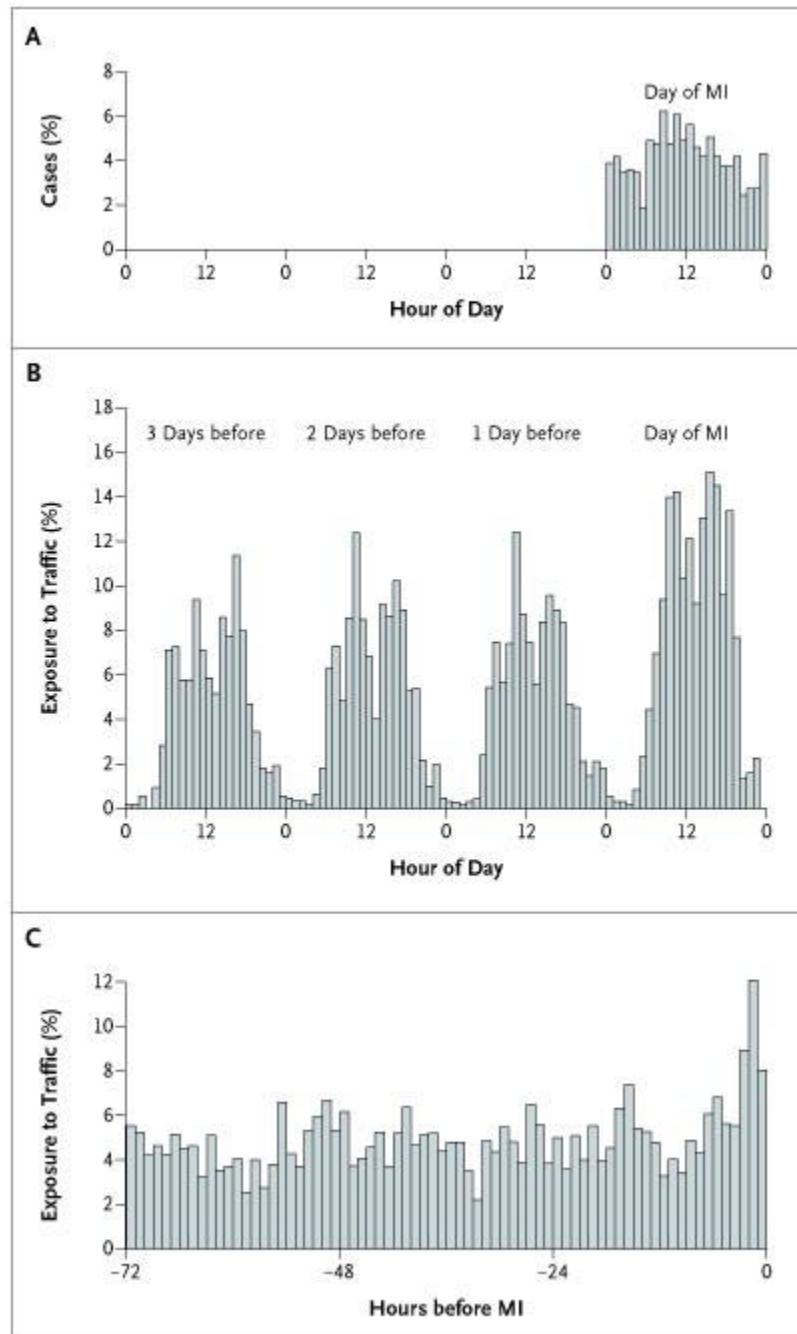


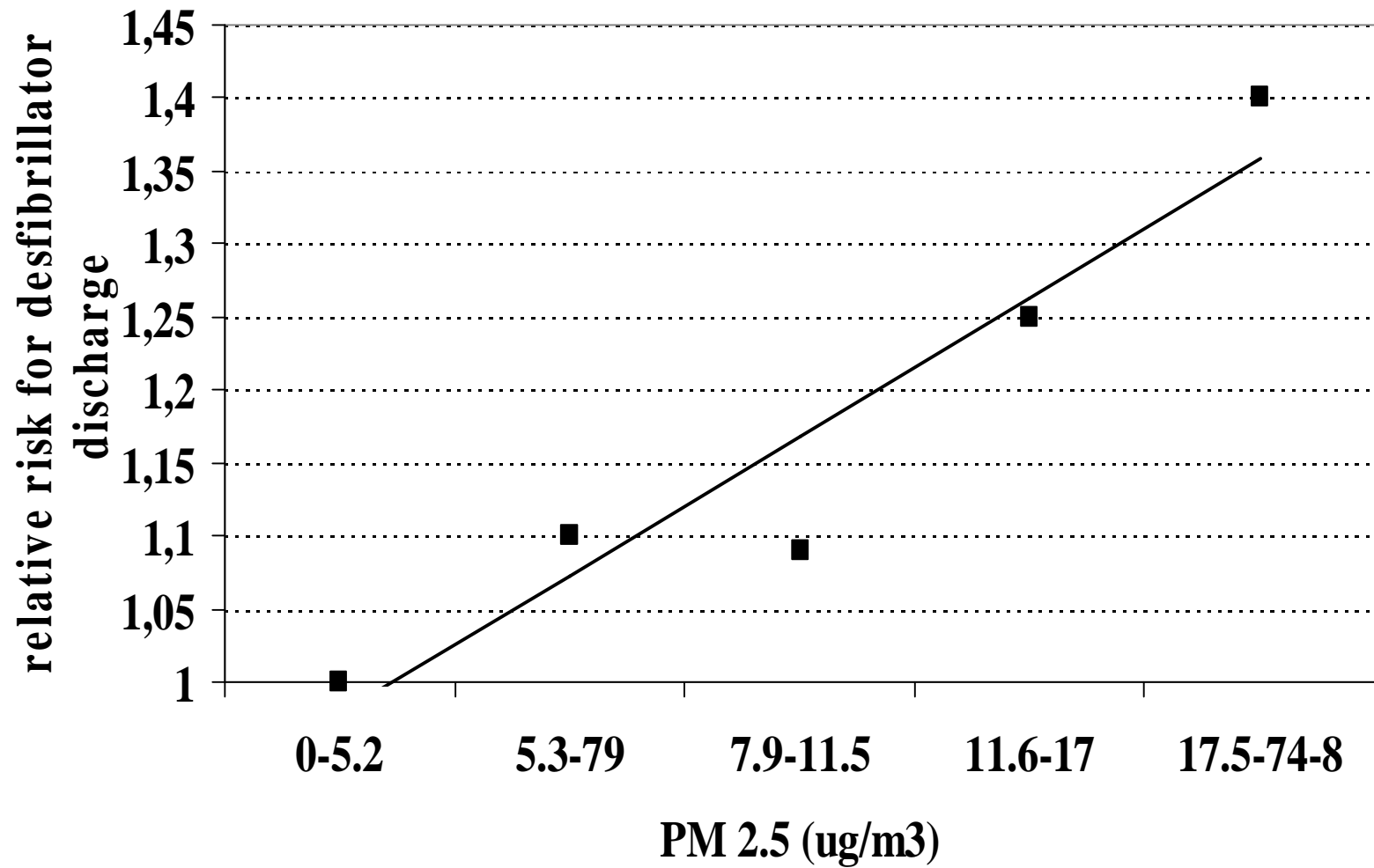
Comparação entre dados observados e simulados de Casos de AVAI na cidade de São Paulo

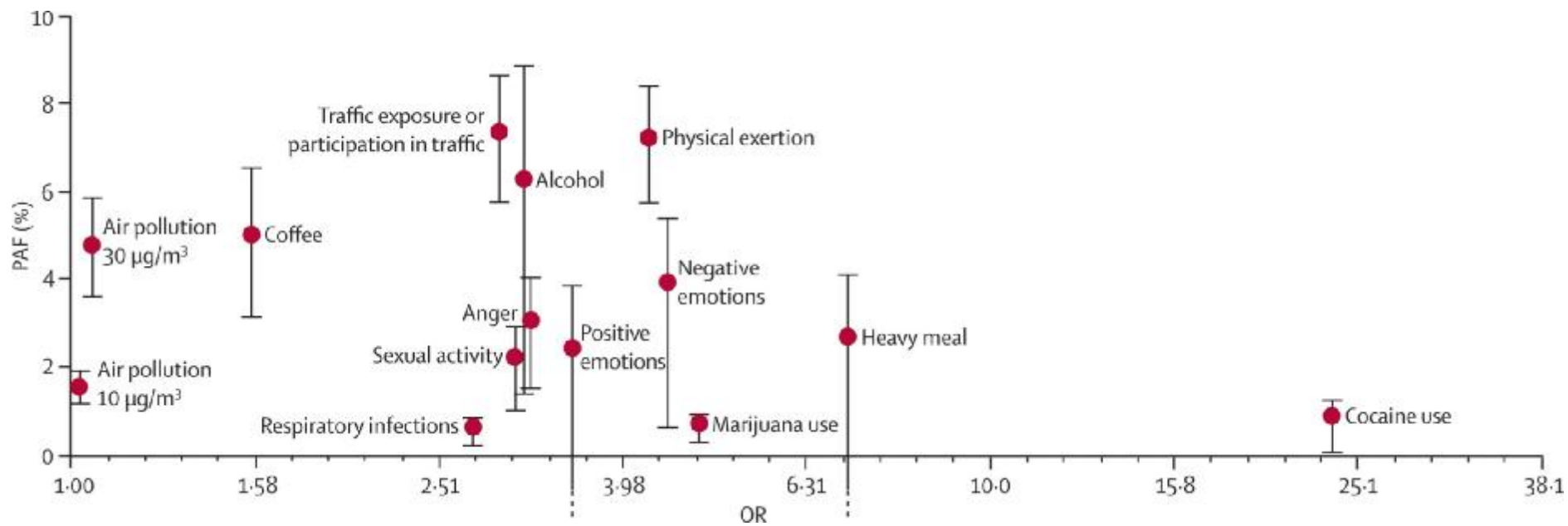




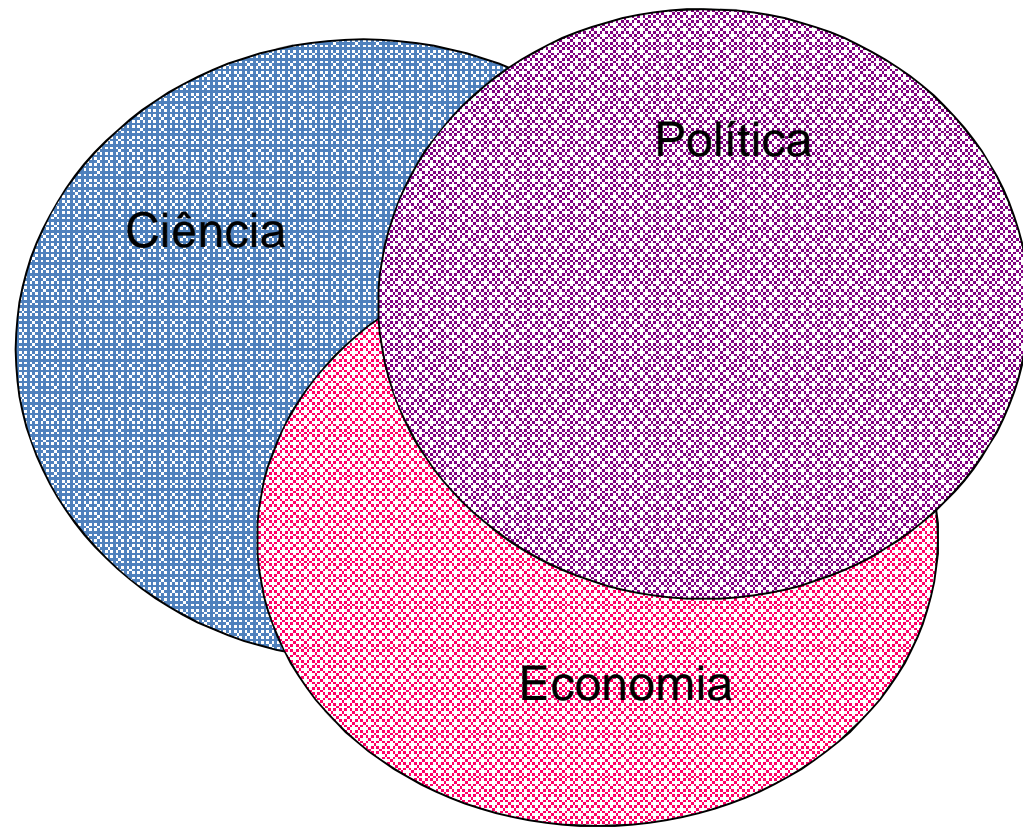








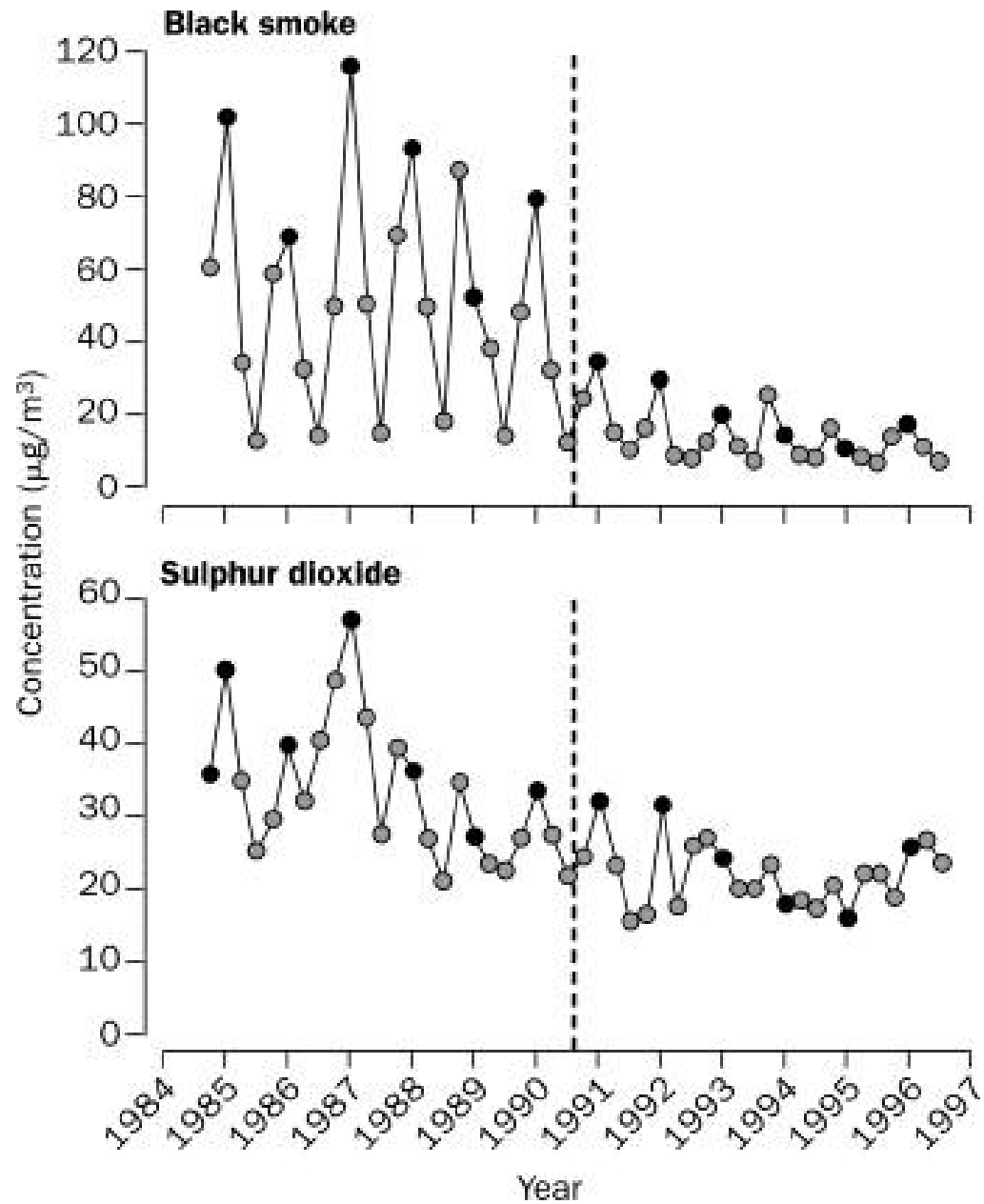
Lancet. 2011 Feb 26;377(9767):732-40

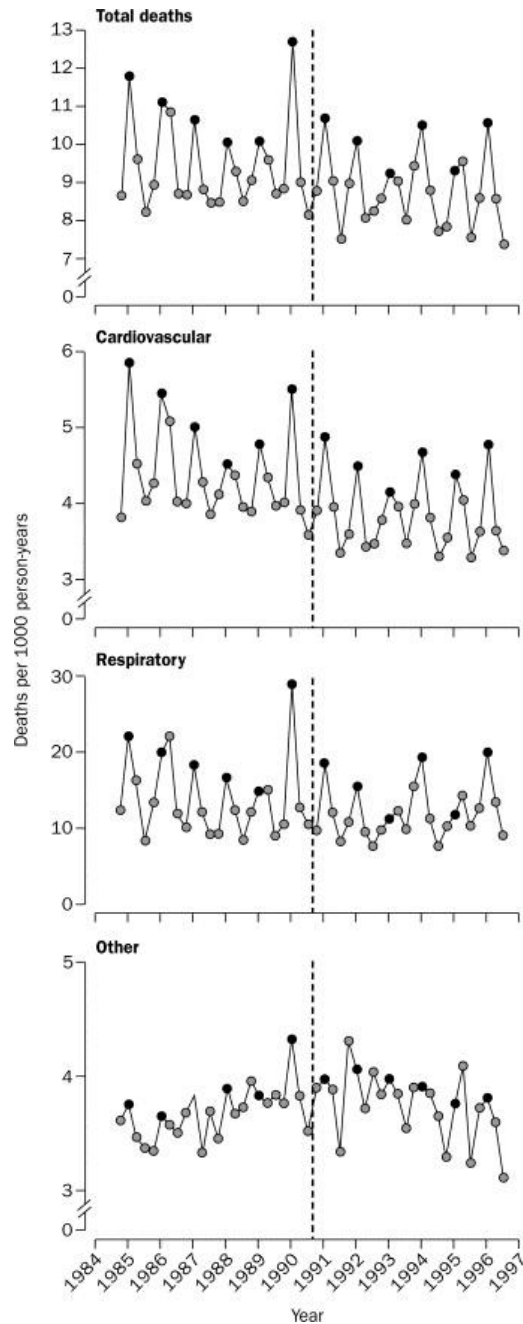


Ciência

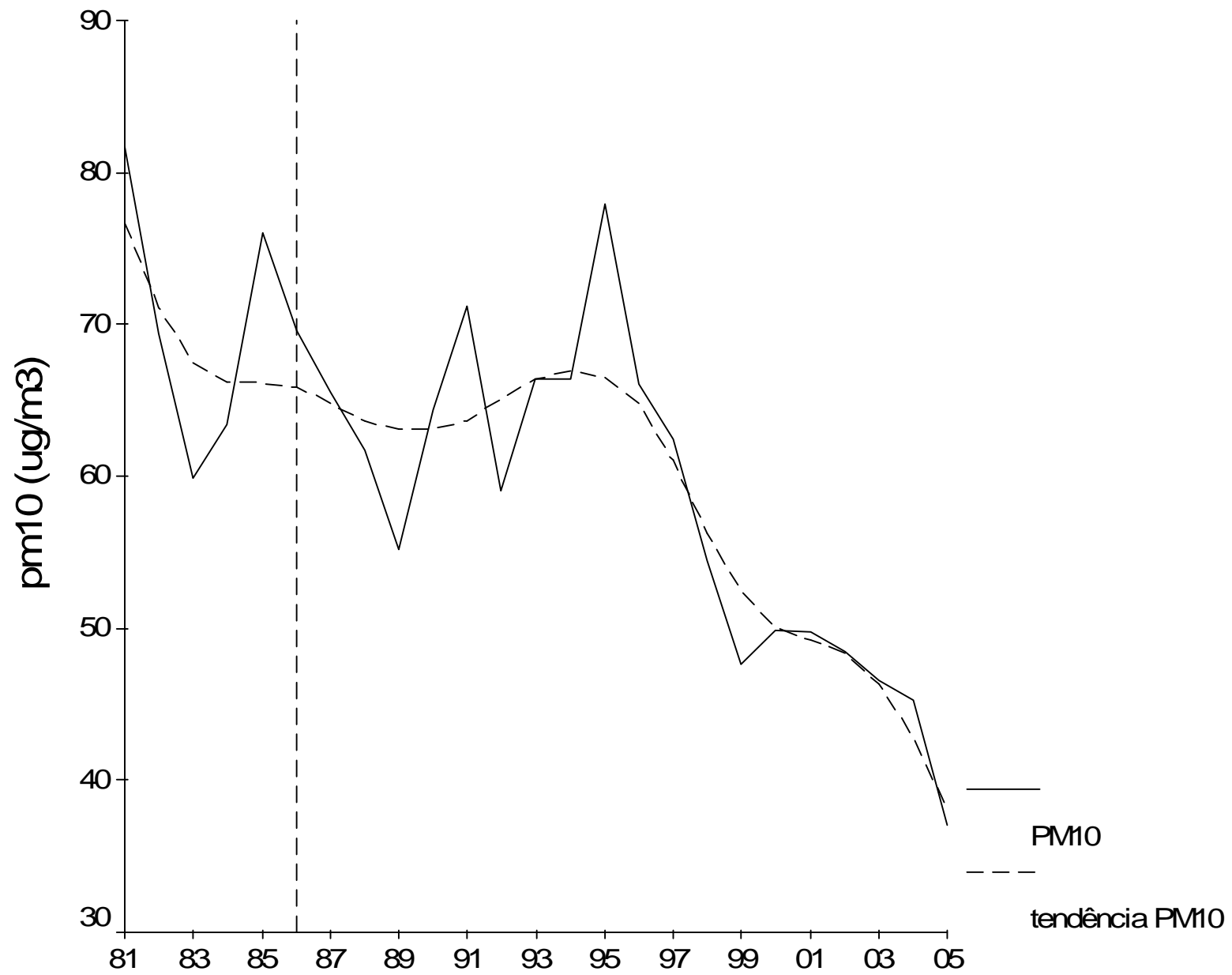
Política

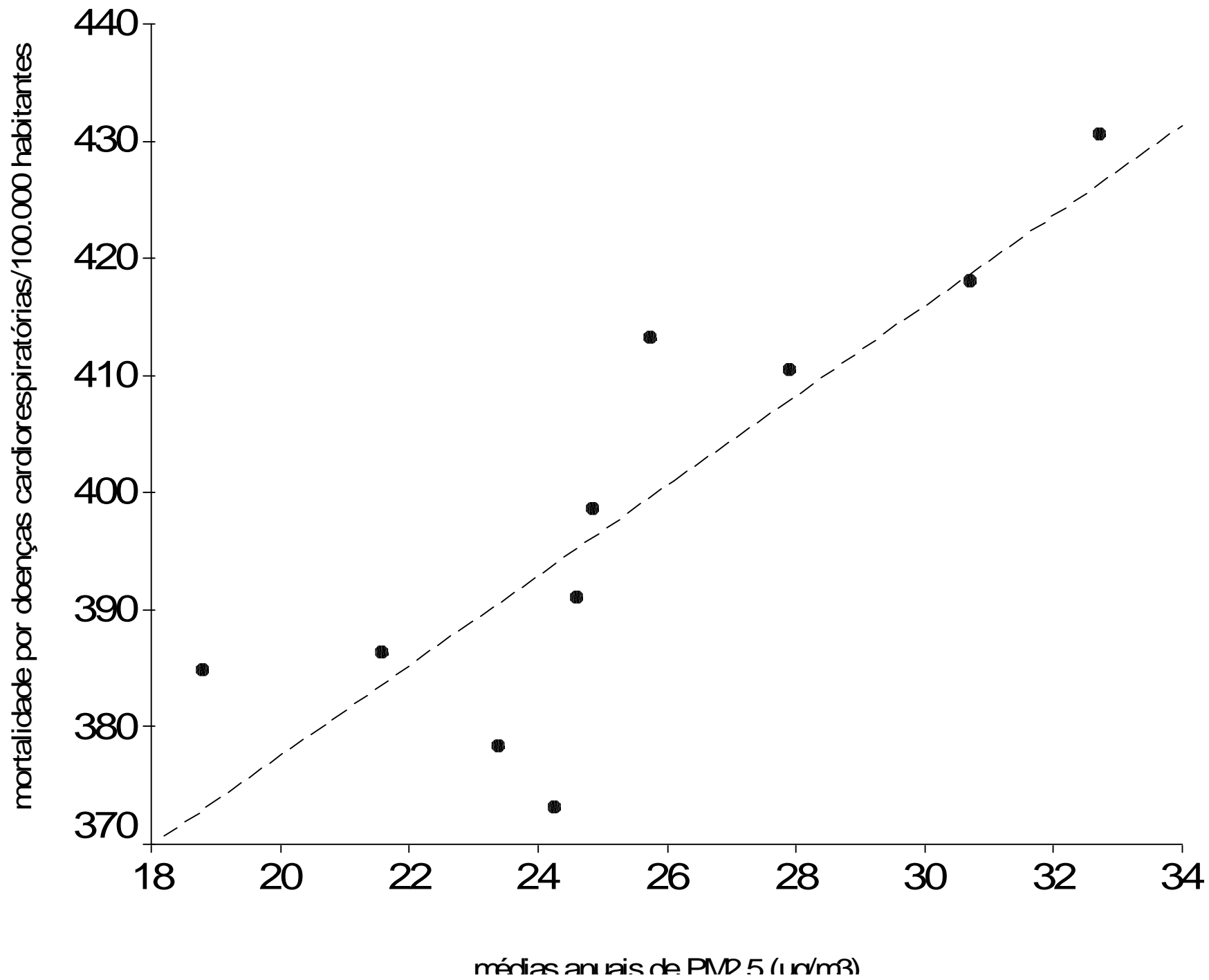
Economia



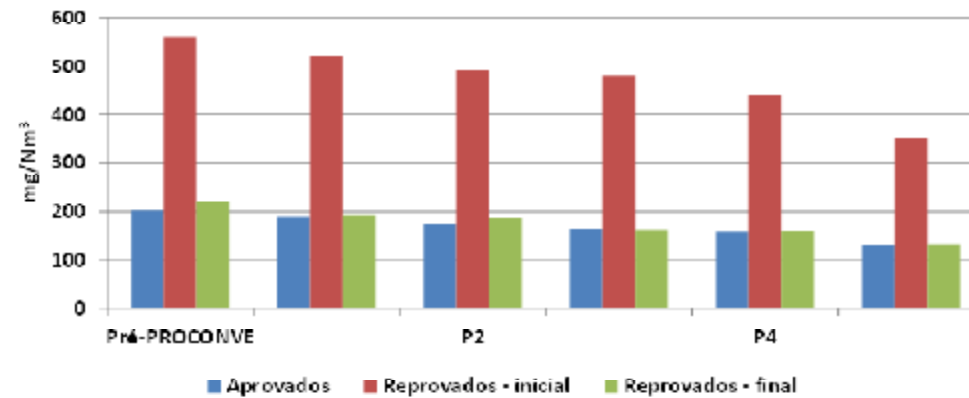


The Lancet, Volume 360, Issue 9341, 19 October 2002, Pages 1184-1185

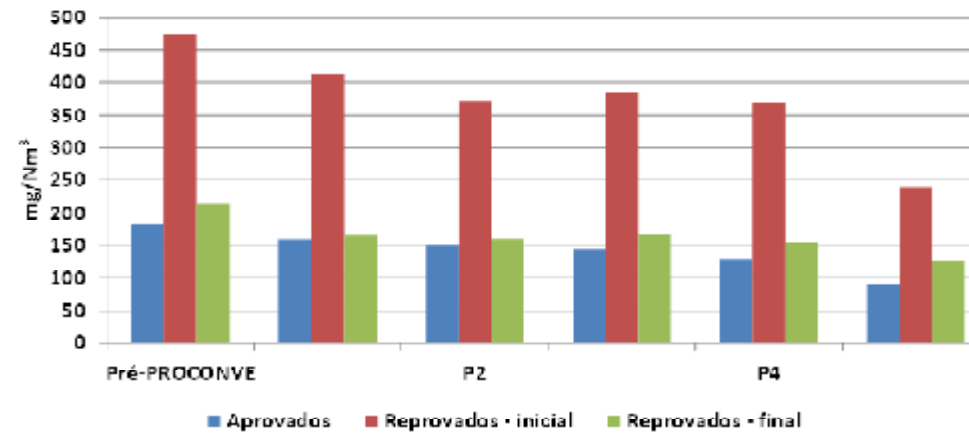


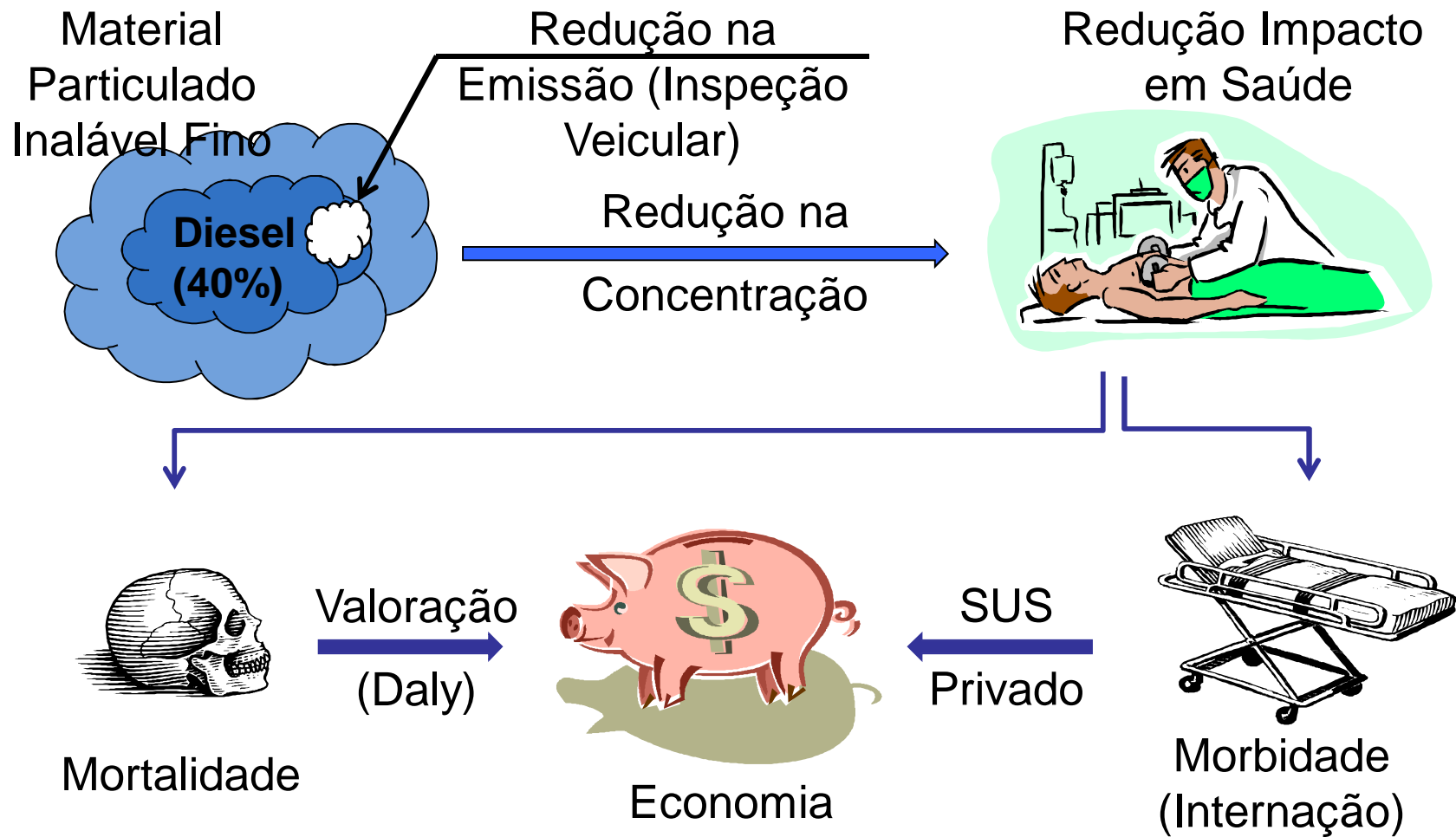


Emissões médias - diesel leves



Emissões médias - diesel pesados





REDUÇÃO NAS EMISSÕES	IMPACTO (MSP)		CUSTO MORBIDADE (US\$)			CUSTO MORTALIDADE (DALY US\$)
	Redução Mortes (N)	Redução Internações (N)	SUS	PRIVADO	TOTAL	
7,00%	252	298	265.687	721.722	987.410	33.341.679
13,80%	498	588	523.783	1.422.824	1.946.607	65.730.738