

**Mercury and PCBs in Asian Market
Fish:
A Response to Results from Mercury
Biomonitoring in New York City**

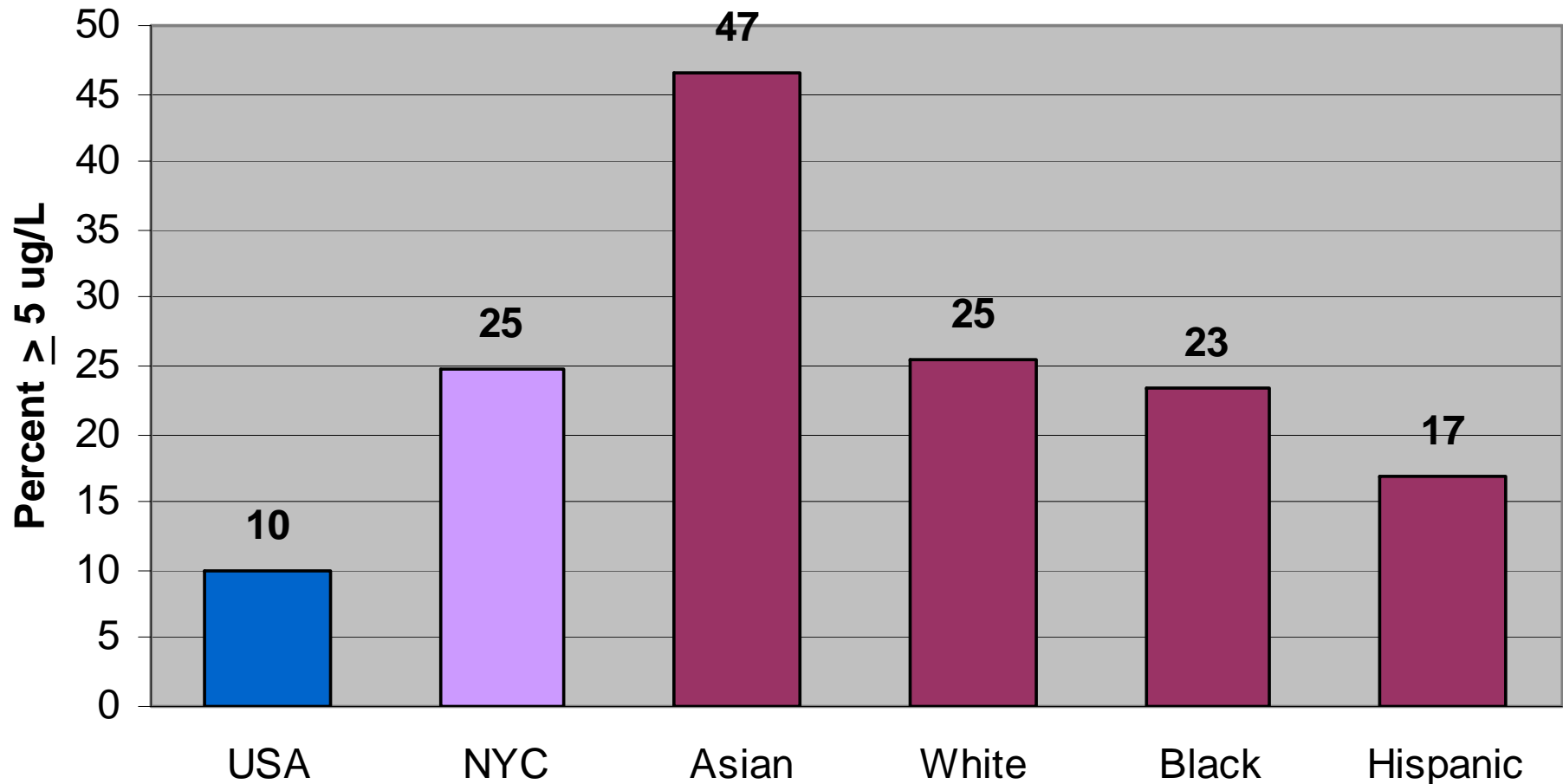
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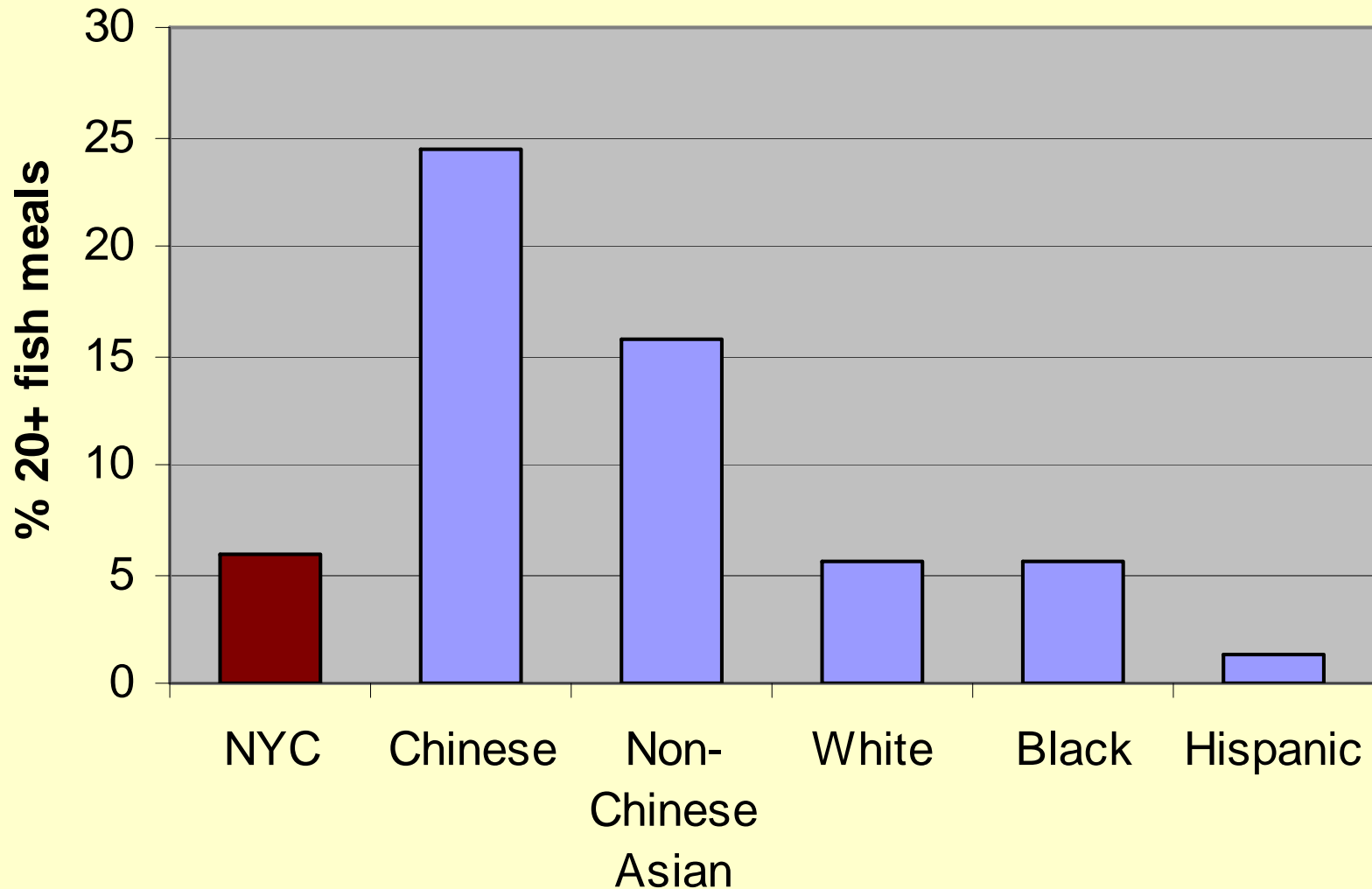
NYC Health and Nutrition Examination Survey

- Modeled after CDC's National HANES
- Population-based sampling of non-institutionalized NYC residents aged 20+ years
- June – December, 2004
- Combination of interview and physical exam (blood samples from 1811 participants)

One in four NYC adults has elevated blood mercury (NYC HANES, 2004)



Percent of New Yorkers Eating Fish or Shellfish 20+ Times in Past Month

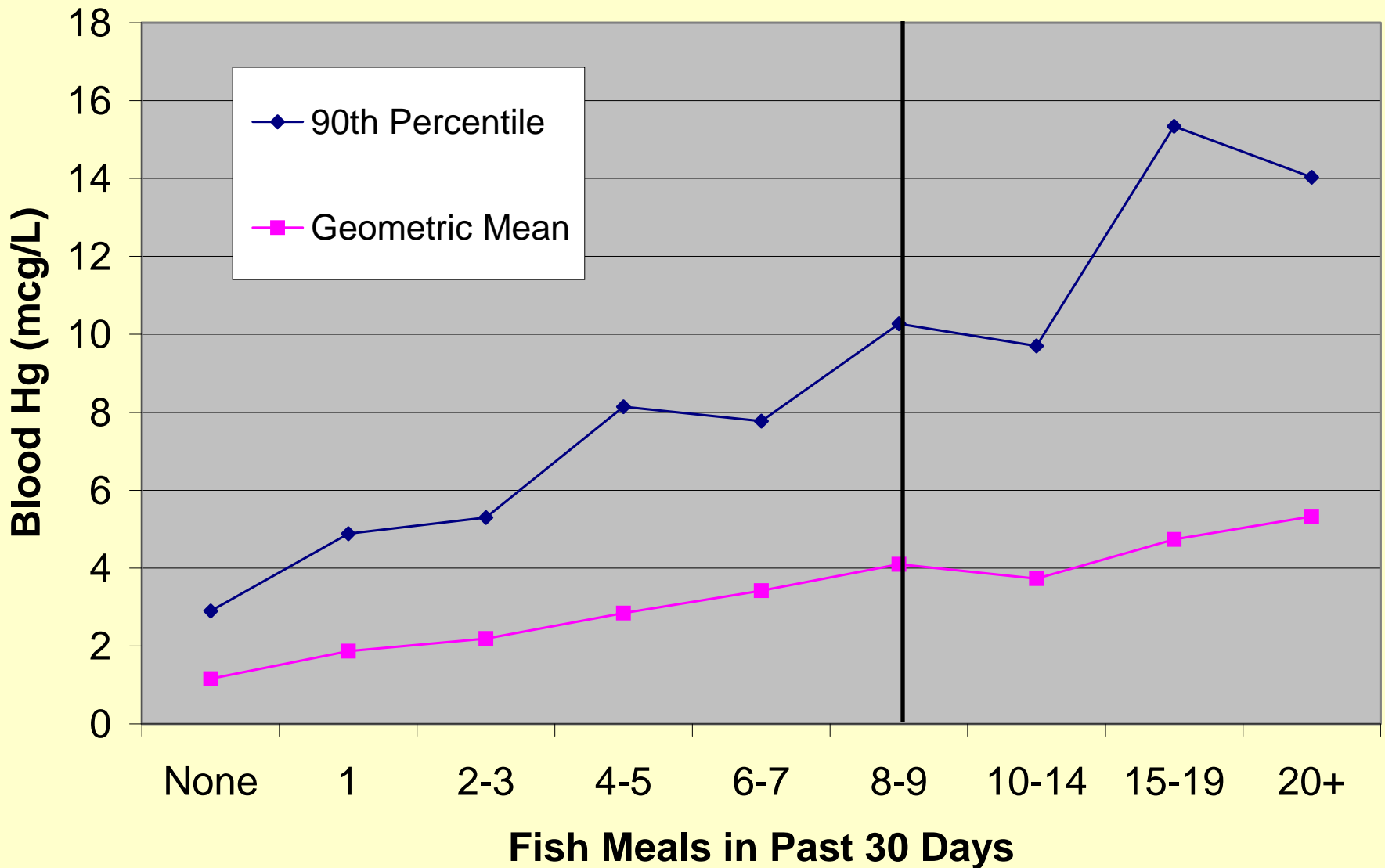


Blood Mercury Concentrations (µg/L) in NYC Adults

	No.	Geometric Mean	95th Percentile
NYC Total	1811	2.7	11.0
Race/Ethnicity			
White	529	2.8	10.9
Black	390	2.6	9.3
Asian	231	4.1	19.2
Hispanic	630	2.3	8.5
Foreign-born Chinese	93	7.3	22.5

Source: NYC HANES 2004

Blood Mercury Levels By Fish Meals in Past 30 Days Among NYC Women 20-49 Years Old



“Eat Fish, Choose Wisely” Brochure

5 Ways to Limit Mercury

1

Choose fish that are
lower in mercury.

2

Don't eat fish that have
the most mercury.

3

Eat fewer – or smaller –
servings of fish.

4

Choose smaller fish.

5

Eat a variety of fish.



More Information

Environmental Protection Agency:
www.epa.gov/ost/fish

Food and Drug Administration:
www.cfsan.fda.gov or call the FDA's Food
Information Hotline toll-free at:
1-888-SAFEFOOD (1-888-723-3366)

New York State Fish Advisories:
[www.health.state.ny.us/environmental/
outdoors/fish/fish.htm](http://www.health.state.ny.us/environmental/outdoors/fish/fish.htm)

Call 311 or visit nyc.gov/health
for more copies of this brochure.



Eat Fish, Choose Wisely Protect Against Mercury

A Guide for
Pregnant and Breastfeeding
Women and Young Children



at fish part of

in calories, and rich in
contain mercury. Most
being concerned about
breastfeeding women,
choose fish wisely.

Babies and

can pass from a
lar amounts, it can
Mercury can cause
en by harming the

eat fish in pregnancy
op well. Still, the less a
y, the better.

en who are pregnant
breastfeeding mothers
er in mercury and limit

ents should choose fish
nd limit the amount
ger than 6 years.

Much Mercury
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d fish that eat other

When people eat fish, the amount of mercury
they take in depends on:

- What kind of fish they eat,
- How often they eat it, and
- How much fish they eat at each meal.

Know Your Serving Size

A typical adult serving size is 4 to 6 ounces. A child's
serving should be smaller. If you eat larger portions,
eat fish less often than recommended in the chart.

- To estimate serving sizes, read food labels or ask about weight.
- A 4-ounce fish steak or fillet is about the size and thickness of a deck of cards.
- Restaurant servings are often much larger than the recommended serving size.
- A typical pair of nigiri sushi, sashimi or a single sushi roll contains about 2 ounces of fish. To avoid harmful bacteria, pregnant women should not eat raw fish.



Weekly Servings of Fish and Shellfish Recommended for Pregnant and Breastfeeding Women, and Young Children

Based on an adult serving size of 6 ounces.
A child's serving should be smaller.

VERY LOW IN MERCURY	Eat Up to 5 Servings a Week
<ul style="list-style-type: none"> • Anchovies • Clams • Crawfish/Crayfish • Hake • Herring • Tilapia • Oysters • Whiting 	<ul style="list-style-type: none"> • Pollock • Salmon* • Sardines • Shrimp • Tuna (Canned Light) • Whitefish

LOW IN MERCURY	Eat Up to 2 Servings a Week
<ul style="list-style-type: none"> • Butterfish • Catfish • Cod • Crab • Croaker (Atlantic) • Flounder • Haddock • Jacksmelt • Mackerel (North Atlantic) 	<ul style="list-style-type: none"> • Mullet • Mussels • Perch (Ocean or White) • Scallops • Shad (American) • Sole • Squid/Calamari • Trout (Freshwater) • Tuna (Canned Light) • Whitefish

HIGH IN MERCURY	Eat No More Than One Serving a Week
<ul style="list-style-type: none"> • Bass (Black, Saltwater, Striped) • Bluefish • Eel • Halibut • Lobster • Monkfish • Salmon 	<ul style="list-style-type: none"> • Scorpionfish • Sheepshead • Skate • Snappers • Tuna (Albacore or Canned White)* • Weakfish/Sea Trout

TOO HIGH IN MERCURY	Don't Eat These Fish!
<ul style="list-style-type: none"> • Chilean Sea Bass • Grouper • Mackerel (Wing or Spanish) • Marlin • Orange Roughy 	<ul style="list-style-type: none"> • Shark • Swordfish • Tilefish • Tuna (Fresh Steaks, Sushi)

Don't eat fish or shellfish caught in local New York City waters – they may contain other contaminants.



New York City Responds...

- **More data needed on mercury in fish species consumed by the Chinese.**
- **Our Agency supported a contaminants in fish study to measure mercury and PCB's in 20 species popular among the Chinese.**

Study Objectives

- **Estimate mercury and PCB levels in market fish consumed by Chinese and Asian New Yorkers.**
- **To improve fish consumption advisories for Chinese and other Asian ethnic groups in NYC.**
- **To improve the consumer information base for reducing mercury and PCB exposure through fish consumption.**

Criteria for Selecting Target Species

- **Availability (based on volume) in stores in the three target neighborhoods.**
- **Inadequate data on mercury content.**
- **Fish is on our “recommended” list, but with potential for PCB contamination.**
- **Change in import patterns.**

Species selected and purchased for mercury and PCB testing

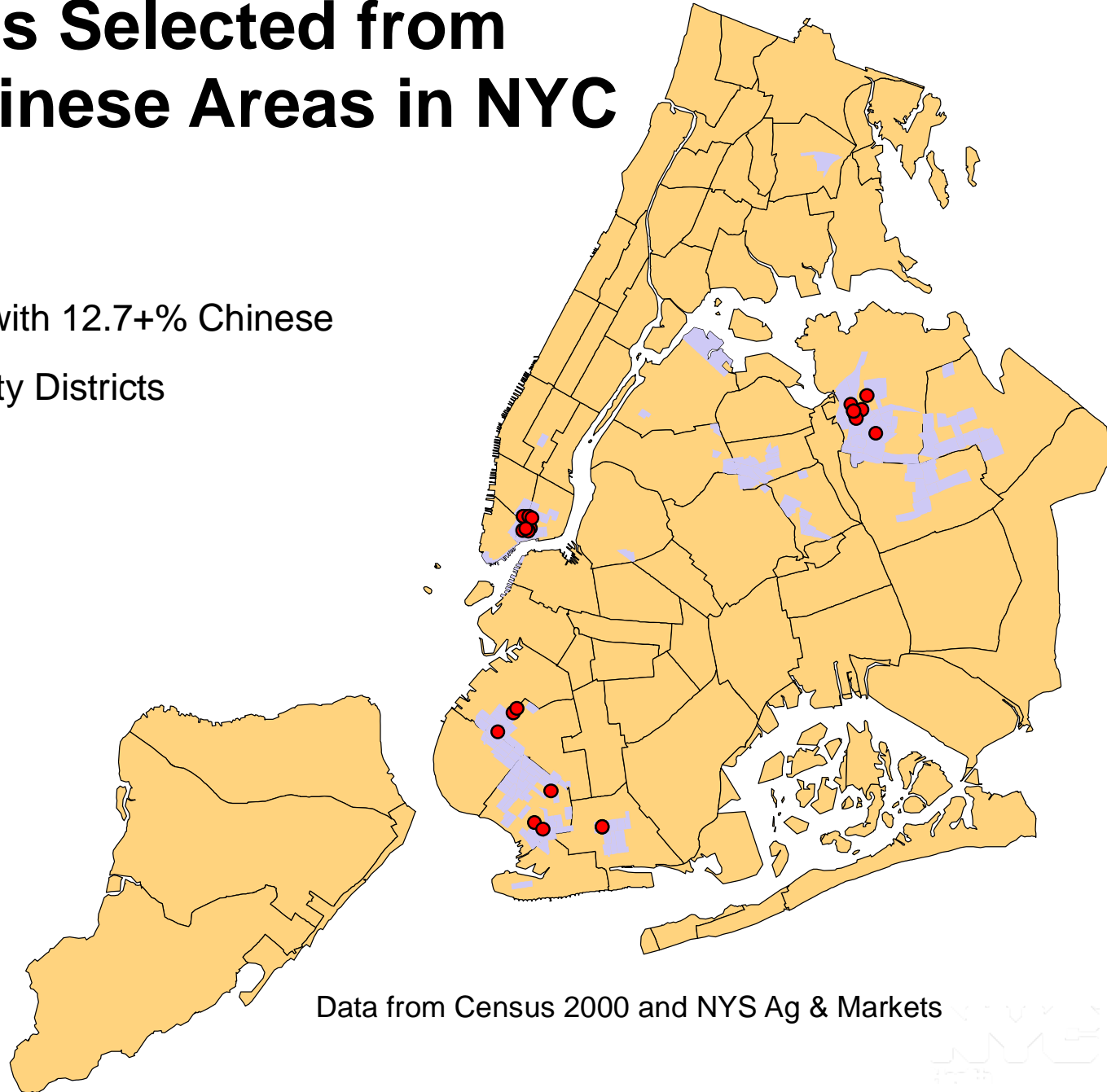
- Bighead Carp
- Buffalo Carp
- Black Sea Bass
- Blue Crab
- Cutlass/Beltfish
- Flounder/Sole
- Golden Pompano
- Hybrid Striped Bass
- Porgy
- Red Snapper
- Sleeper
- Spanish Mackerel
- Blackfish/Tautog
- Tilapia
- Tilefish
- Unagi Eel
- White Pompano
- Yellow Croaker
- Canned Eel
- Canned Dace

Study Design & Protocol

- Identified fish markets in NYC.
- Selected markets from those located in the top 10% Chinese populated census tracts.
- Markets were selected according to the relative Chinese population size in Queens, Manhattan and Brooklyn.
- Sample size of 15 for each target species: 4, 5 and 6 specimens from markets in Manhattan, Brooklyn and Queens, respectively.
- Samples collected Aug – Sep, 2007

Fish Markets Selected from Densest Chinese Areas in NYC

- Fish Markets
- Census tracts with 12.7+% Chinese
- NYC Community Districts



Data from Census 2000 and NYS Ag & Markets



Laboratory Methods

- Total mercury (n=282) – CVAA EPA method 245.6 (LOD = 4 ppb)
- Total 101 PCB congeners (n=196) – parallel dual-column GC-ECD (IDL: 0-0.017 ppb) – based on EPA method 8082
- PCB method also measures organochlorine pesticides: DDE, HCB and Mirex
- QA/QC
 - Method & reagent blanks
 - Blind duplicates and laboratory replicates
 - Standardized or certified reference materials
 - Surrogate standard (PCBs)

New York City Market Fish Sampling Target Species



Hybrid Striped Bass (14"; \$4.05/lb)



Black Sea Bass (13"; \$4.60/lb)



Blackfish (16"; \$9.60/lb)



Sleeper (11"; \$7.90/lb)

New York City Market Fish Sampling Target Species



Beltfish (33"; \$2.60/lb)



Yellow Croaker (11"; \$4.55/lb)



Buffalo Carp (22"; \$3.15/lb)



Bighead Carp (25"; \$2.85/lb)

New York City Market Fish Sampling Target Species



White Pompano (9.5"; \$3.85/lb)



Golden Pompano (11.5"; \$2.95)



Spanish Mackerel (17"; \$2.55/lb)



Porgy (11"; \$2.40/lb)

New York City Market Fish Sampling Target Species



Tilapia (12"; \$1.90/lb)



Red Snapper (15"; \$4.40/lb)



Rex Sole (Flatfish: 16"; \$3.45/lb)



Tilefish (22.5"; \$4.85/lb)

New York City Market Fish Sampling Target Species



Canned Eel (\$1.25)



Canned Dace (\$1.25)

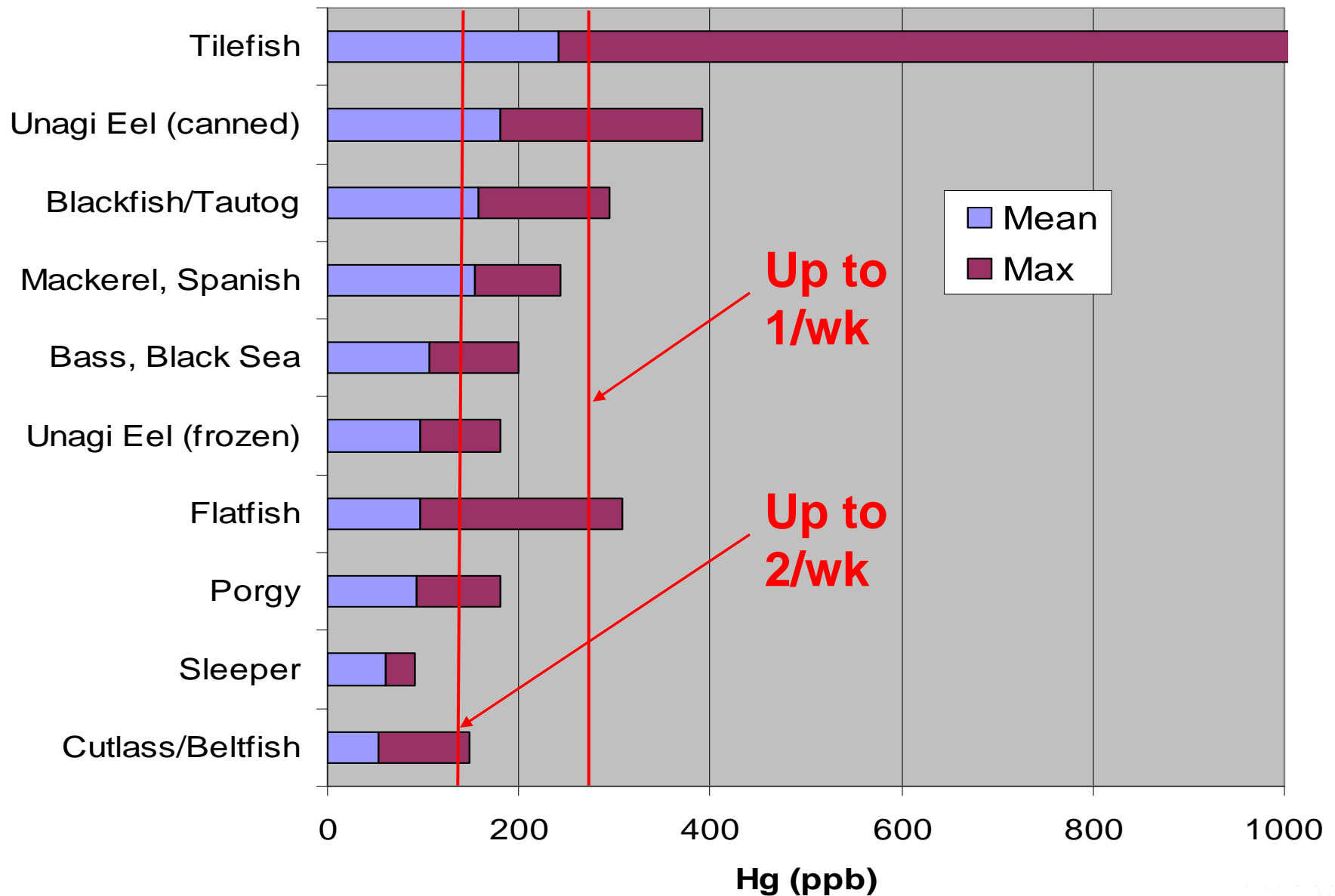


Frozen Unagi Eel (\$3.85)



Blue Crab (6"; \$4.30/6)

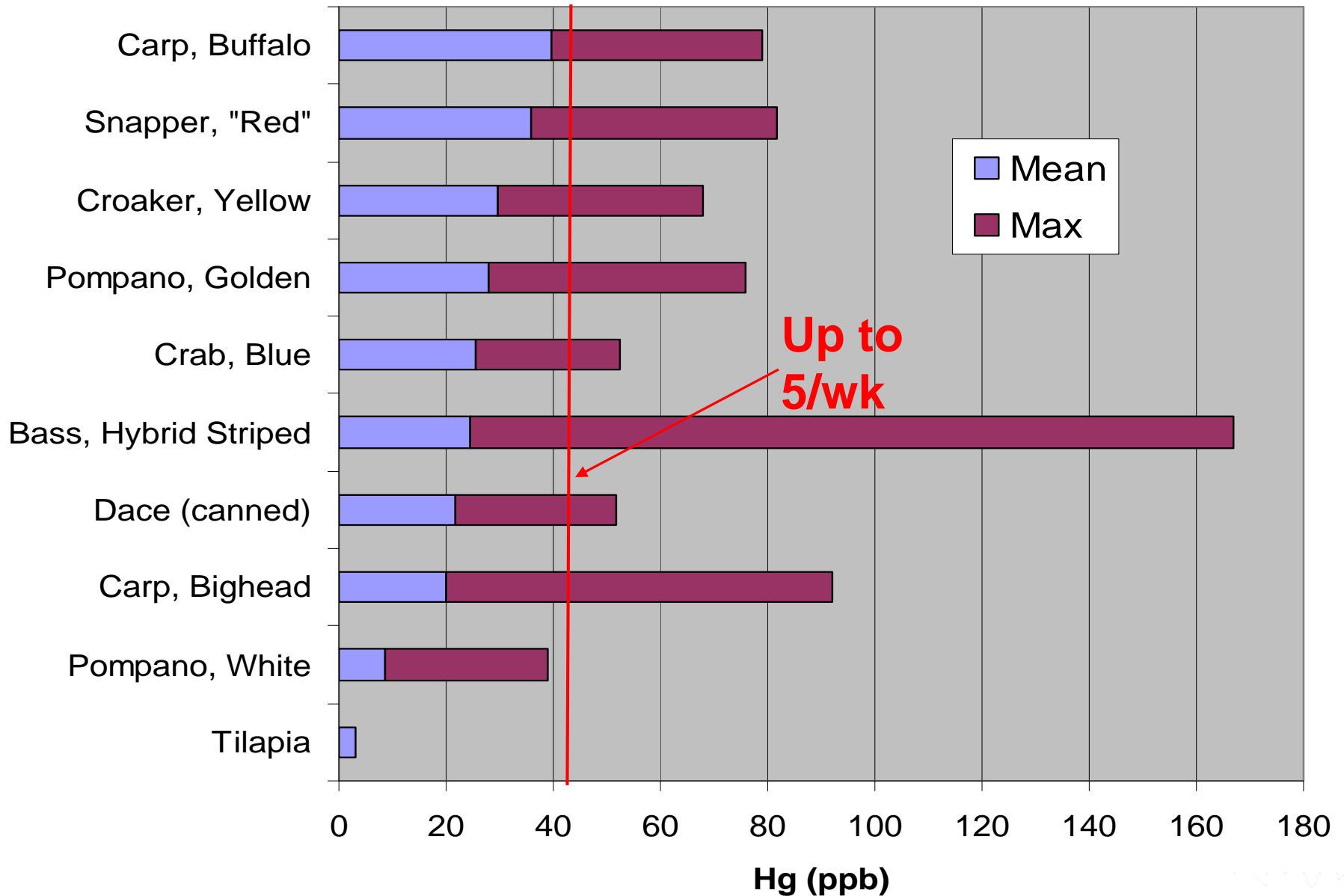
Meal Limits per Week Based on Hg Levels*



* Rfd=0.01 ug/kg/d; 60 kg woman; 6-oz portion

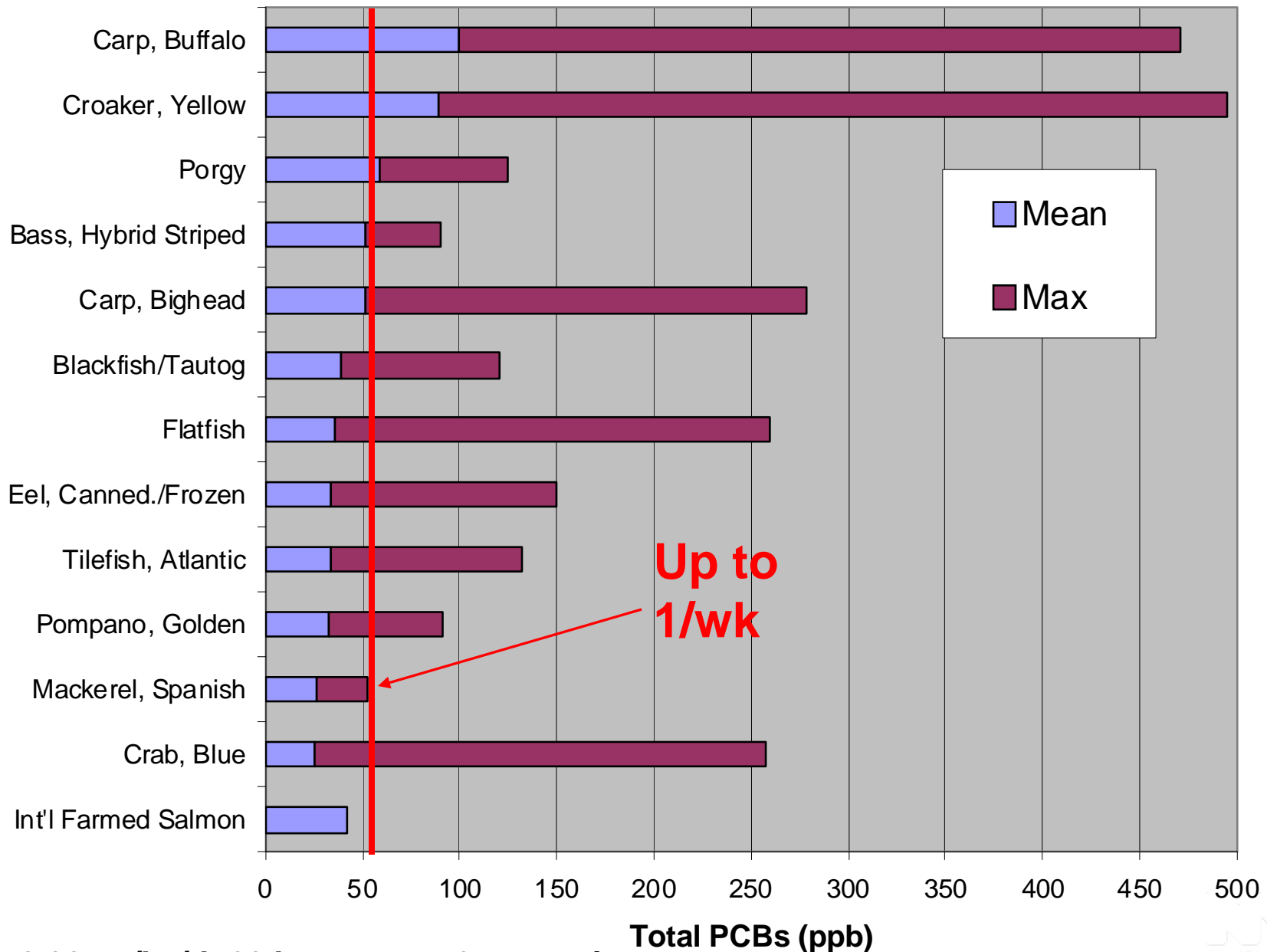


Meal Limits per Week Based on Hg Levels*



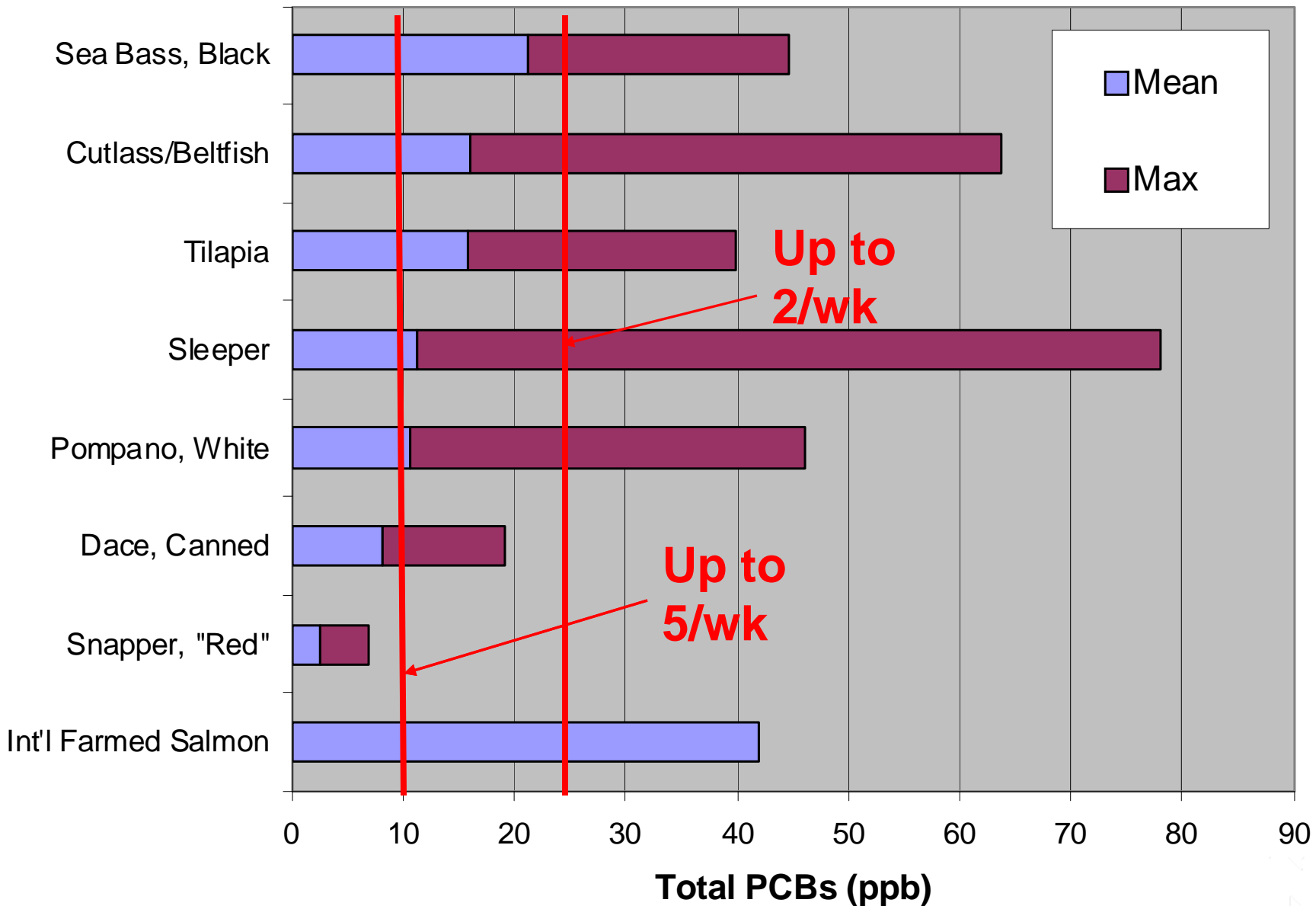
* Rfd=0.01 ug/kg/d; 60 kg woman; 6-oz portion

Meal Limits per Week Based on PCB Levels*



* Rfd=0.02 ug/kg/d; 60 kg woman; 6-oz portion

Meal Limits per Week Based on PCB Levels*



* 0.02 ug/kg/d; 60 kg woman; 6-oz portion

		Meal Limits Based on Average Hg Levels		
		5/week	2/week	1/week
Meals Limits Based on Avg. PCBs	5/wk	Dace, canned Snapper, red		
	2/wk	Pompano, white Tilapia	Bass, black sea Sleeper Cutlass	
	1/wk	Pompano, golden Crab, blue Carp, bighead Bass, hybrid striped	Eel, frozen Flatfish	Blackfish Mackerel, Spanish Tilefish Eel, canned
	Do not eat	Croaker, yellow Carp, buffalo	Porgy	

Proposed Bins Based on Mercury Levels (Tagging High PCB Levels)

Up to 5/week	Up to 2/week	Up to 1/wk	Do not eat
Carp, Bighead Carp, Buffalo Crab, Blue Croaker, Yellow Dace (Mud Carp) Pompano, Golden or White Tilapia	Bass, Hybrid Striped Bass, Black Sea Cutlass Flounder Porgy Sleeper Snapper, Red Sole	Blackfish Eel Mackerel, Spanish	Tilefish

*** These fish may contain high levels of PCBs**

Conclusion

- Higher Hg levels in Chinese New Yorkers probably due to eating more (lower Hg) fish and lower bodyweight.
- No evidence that specimens from Chinese markets are higher in Hg.
- High within-species variability in PCB levels.
- OC pesticide levels were low.
- Hg and PCB levels not strongly correlated, which complicates combining the data in risk messages.
- Communicating meal allowances for combinations of species is a challenge.

PCB Risk Communication - Discussion Questions

- Should we communicate species-specific PCB risks, based on the data we collected?
 - Did we collect enough data?
 - Does high intra-species variation warrant species-specific messages?
 - Does it matter that we do not have PCB data on all species?
- Should we combine data from various studies?
- Is the EPA 0.02 $\mu\text{g/kg/d}$ reference dose an appropriate choice for advice directed to pregnant women and young children?

An Inter-Agency Collaboration

- **NYC DOHMH**
 - Study design, conduct and presentation of results
 - Outreach to NYC Chinese community.
- **US EPA Region 2**
 - Chinese fish market expertise
 - Testing of fish from Fulton Fish Market
- **NYS Agriculture & Markets**
 - Data on fish markets
 - Testing of high mercury fish
- **CUNY-Hunter College**
 - Field work and specimen processing
- **SUNY-Albany**
 - Mercury and PCB analyses

Contributors

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