Fish Consumption Rates

Two sampling issues examined

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Two questions I want to examine with you

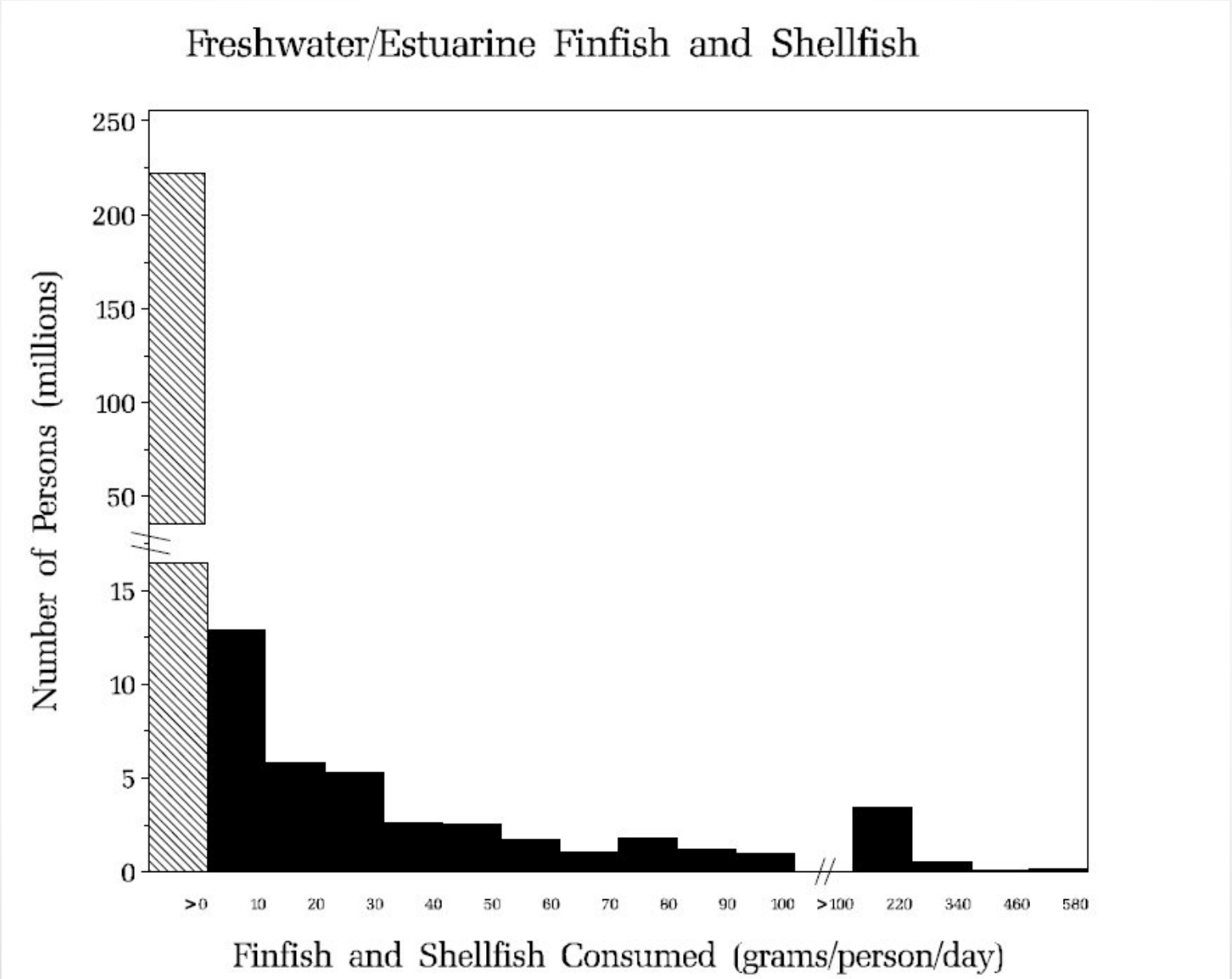
1. What happens if we mistakenly identify some consumers of fish as non-consumers of fish?

2. What happens if we miss some hard-to-reach people, AND they are high-end consumers?

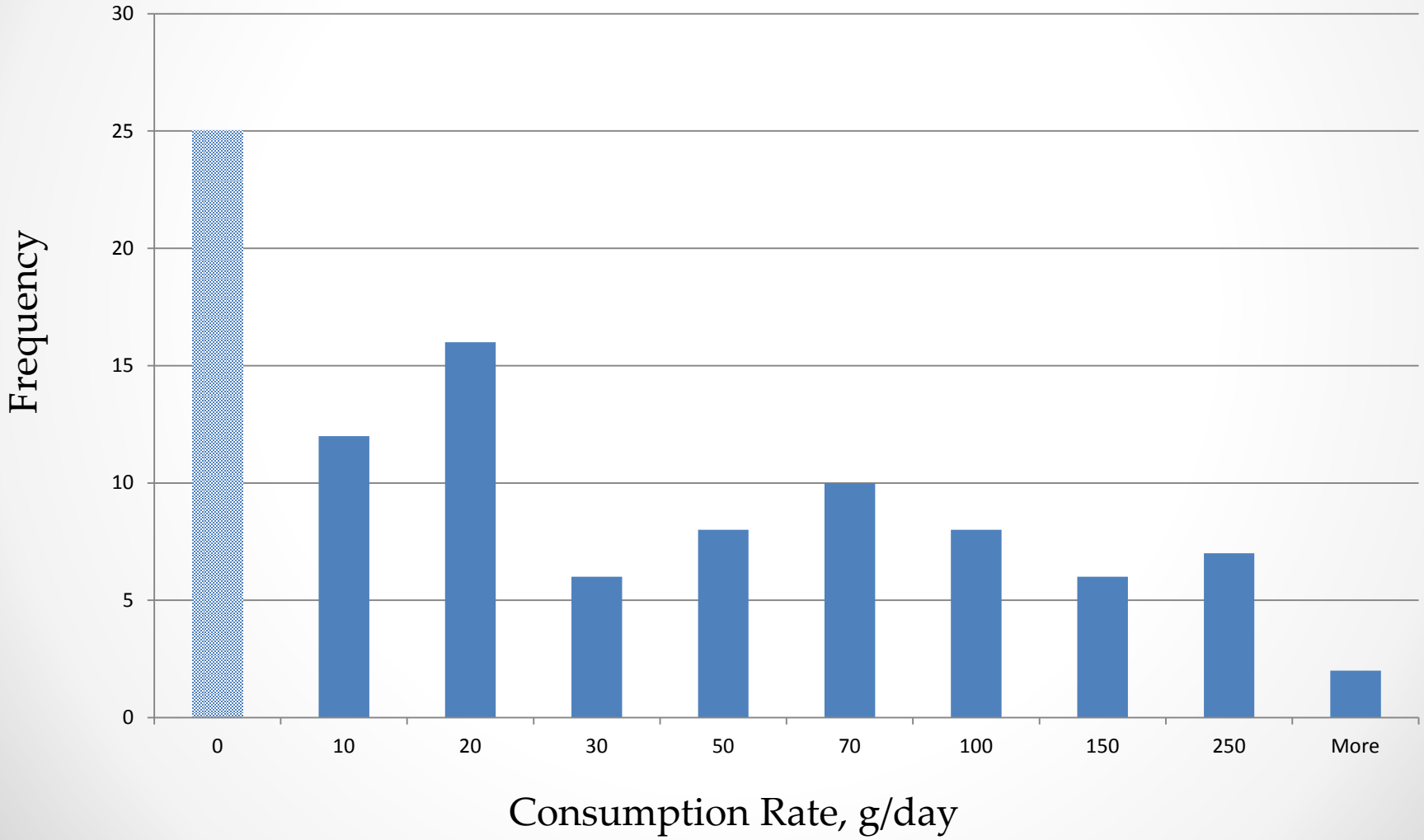
We will look at & compare 3 hypothetical distributions

1. A hypothetical base distribution, with 25% non-consumers
2. A modified base distribution in which 3/5ths of the apparent non-consumers actually consume fish, albeit at a low rate
3. A modified base distribution in which 5% more people are surveyed, whose consumption rates are in the upper half of the base distribution

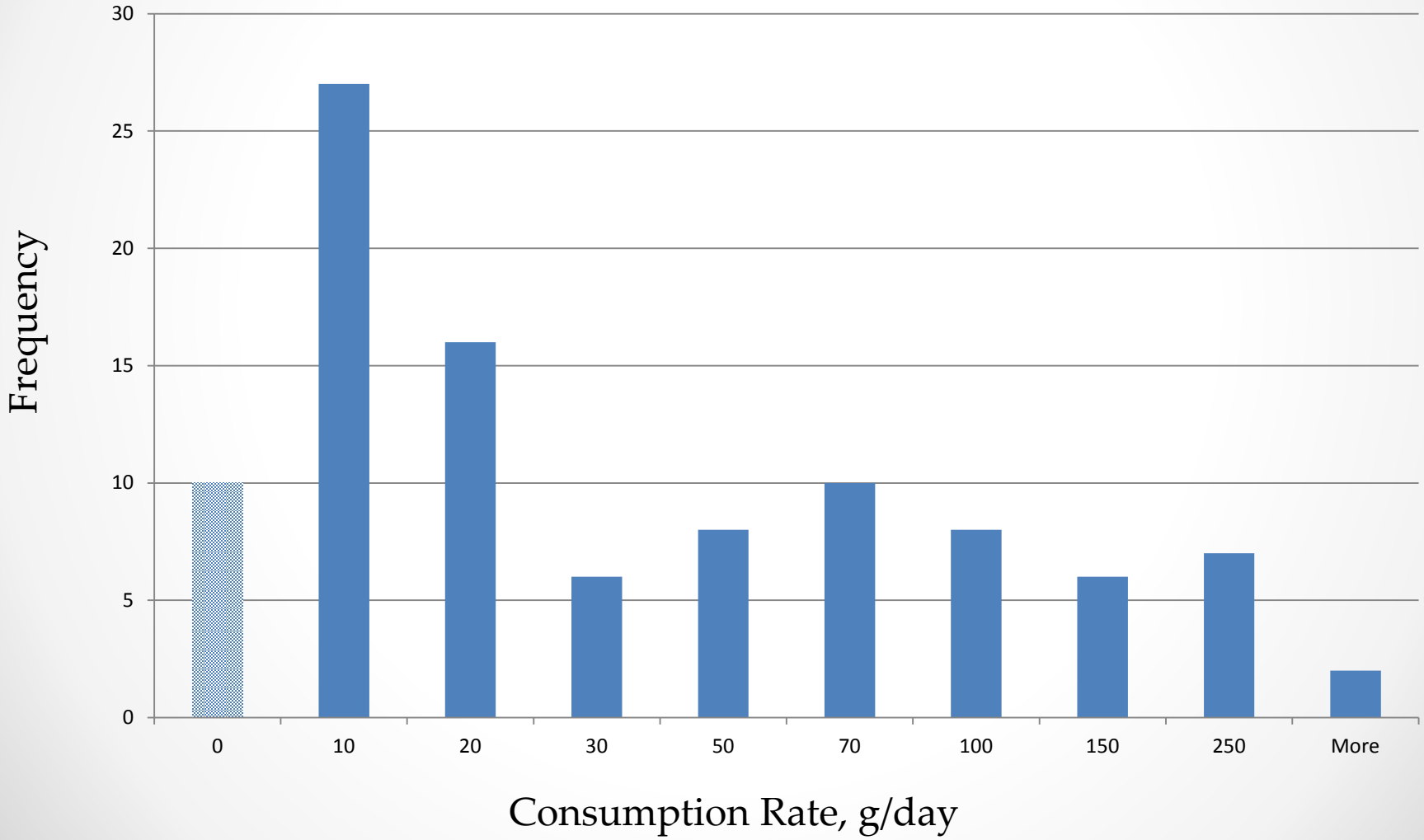
Figure 5-1-1-1 From EPA 2002



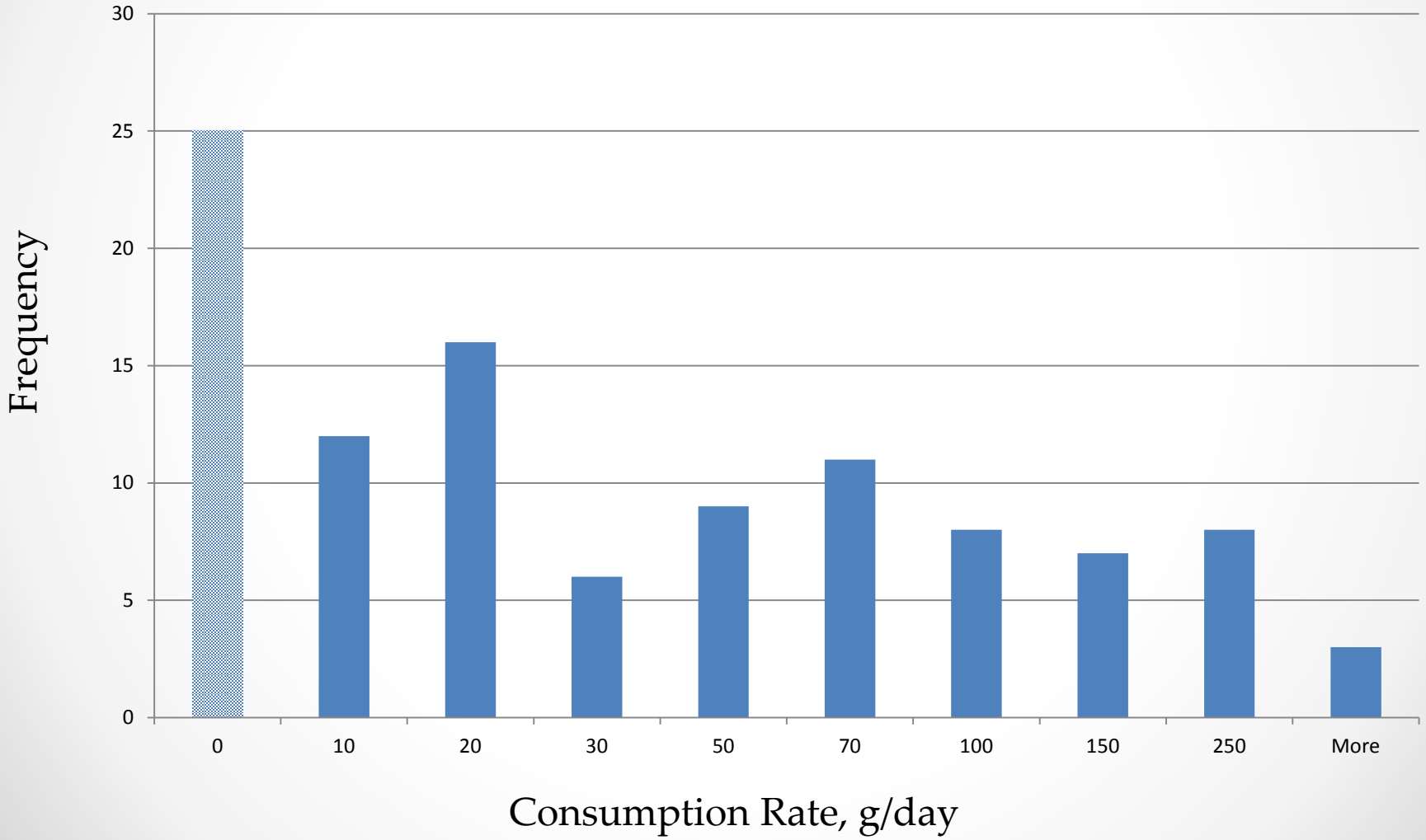
Hypothetical fish consumption distribution #1



Hypothetical fish consumption distribution #2



Hypothetical fish consumption distribution #3



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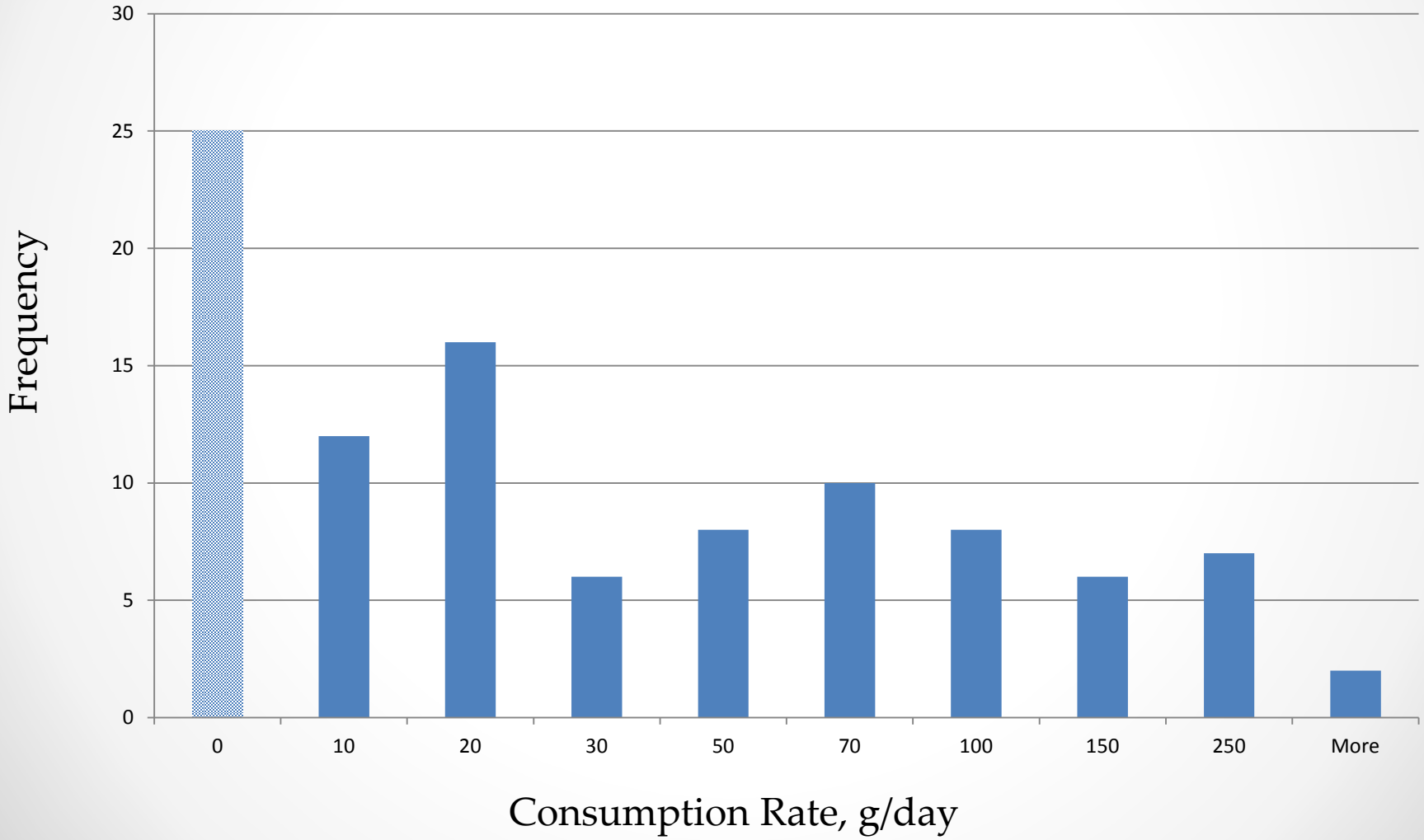
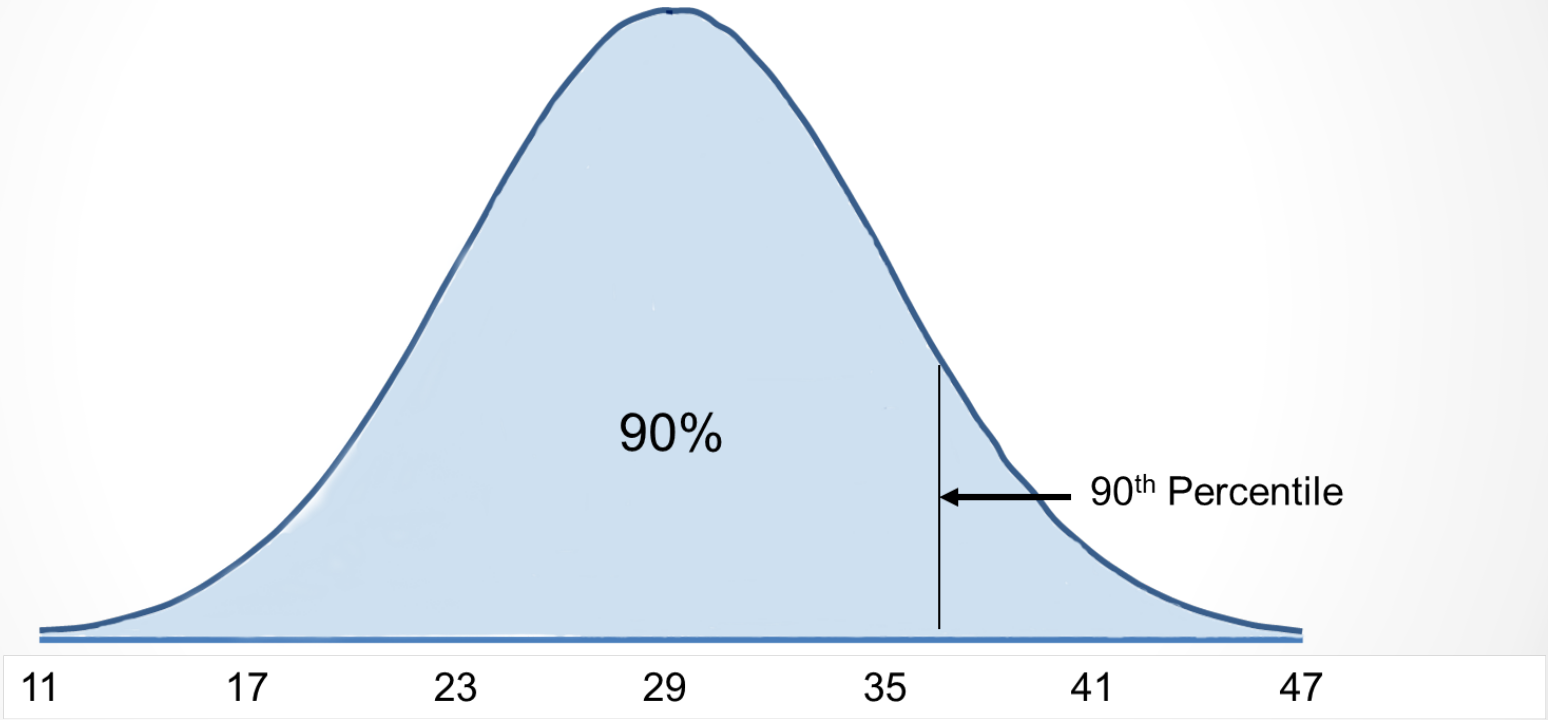


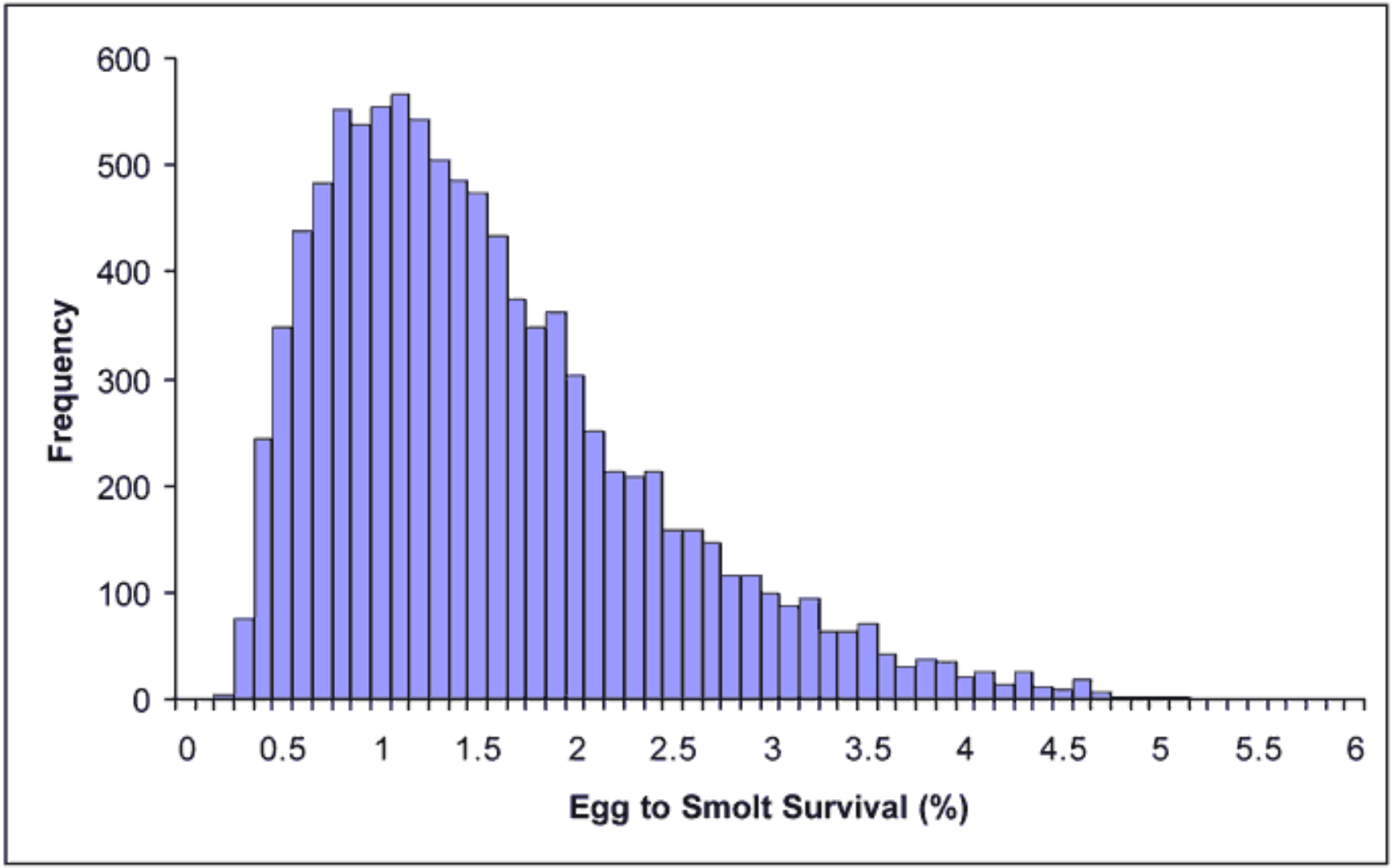
What Statistics?

- For fish consumption rates that go into risk assessment or water quality criteria we generally focus on the upper half of the distribution.
- But there are many statistics that can be used to describe the data
- We'll look at these five:
  1. Median, or 50th percentile
  2. Mean
  3. 90th percentile
  4. 95th percentile
  5. 99th percentile

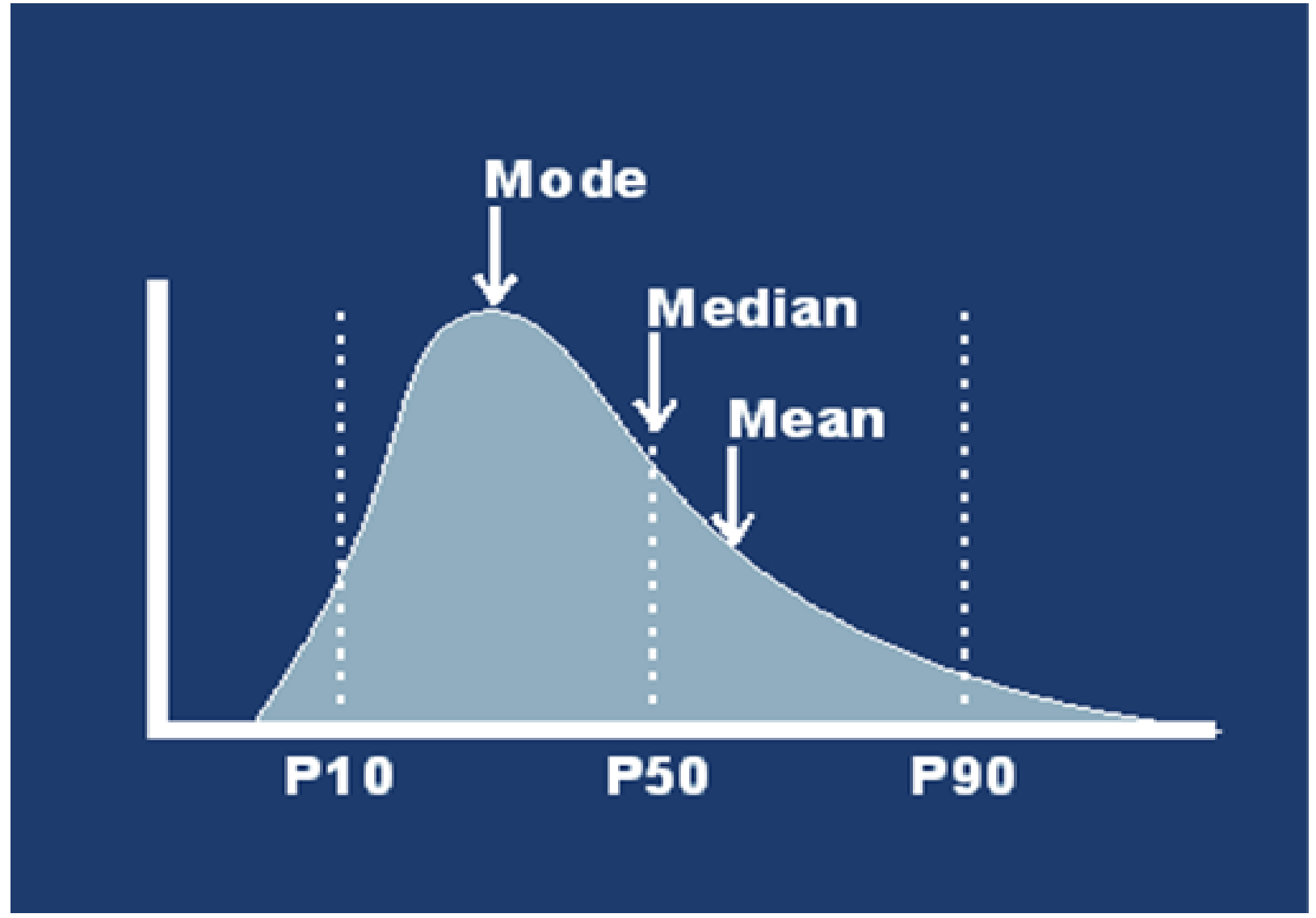
Normal Distribution

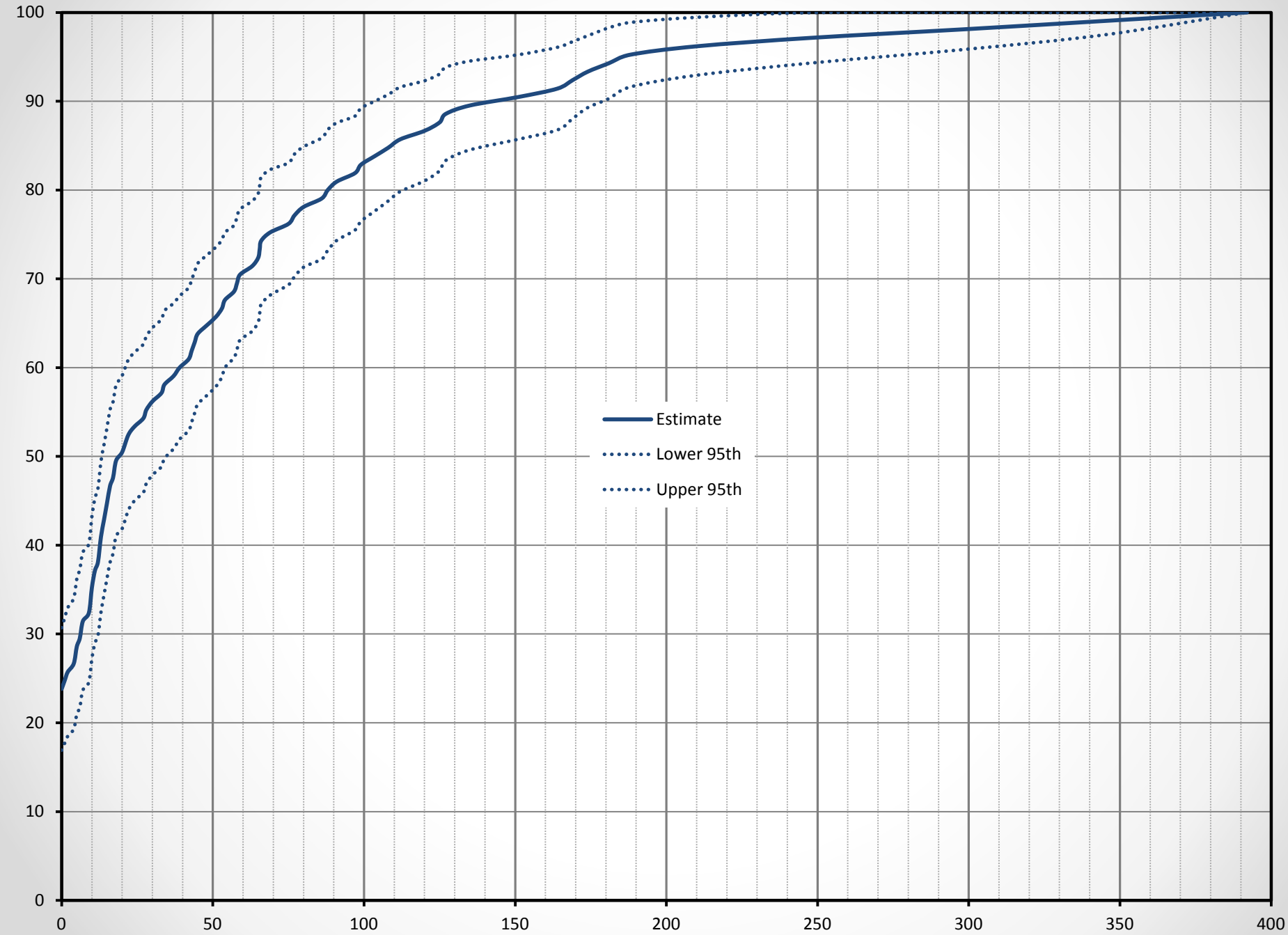


Log Normal Distribution



What/Who is normal?

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150
200
250
300
350
400
Estimate
Lower 95th
Upper 95th

The Statistics

Distribution #1

	ALL	FCR >0 Only
Median	17.5	39.0
Mean	47.5	63.3
90	127.8	158.8
95	174.7	194.6
99	298.5	310.2

Distribution #2

	ALL	FCR >0 Only
Median	17.5	23.0
Mean	47.5	52.8
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Distribution #3

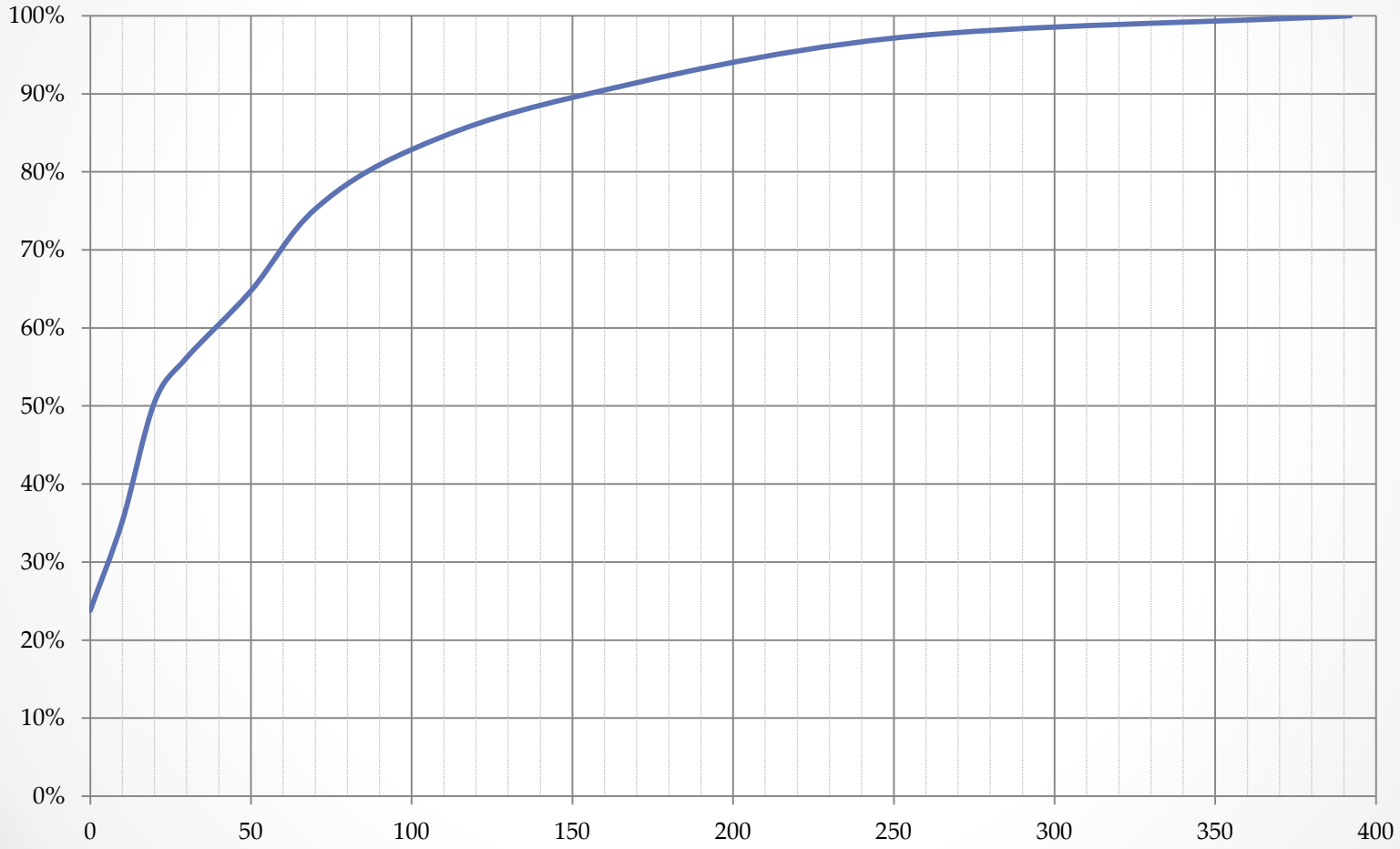
	ALL	>0 Only	High
Median	20.0	43.5	103.5
Mean	52.7	69.2	157.2
90	144.6	169.5	307.6
95	186.6	211.9	349.8
99	343.1	354.9	383.6

Summary

- Misidentifying low consumers as non-consumers will raise consumption rate statistical estimates, create a high bias
- This matters only IF we don't use statistics based on the whole population
- Missing a fraction of the population who are high end consumers will lower consumption rate statistical estimates, create a low bias
- If we have an idea of how many we missed and how much they eat, we can construct a fuller distribution
- Biases due to these sampling issues are likely small compared to the range in choice of statistic

Questions?

Cumulative Density Plot



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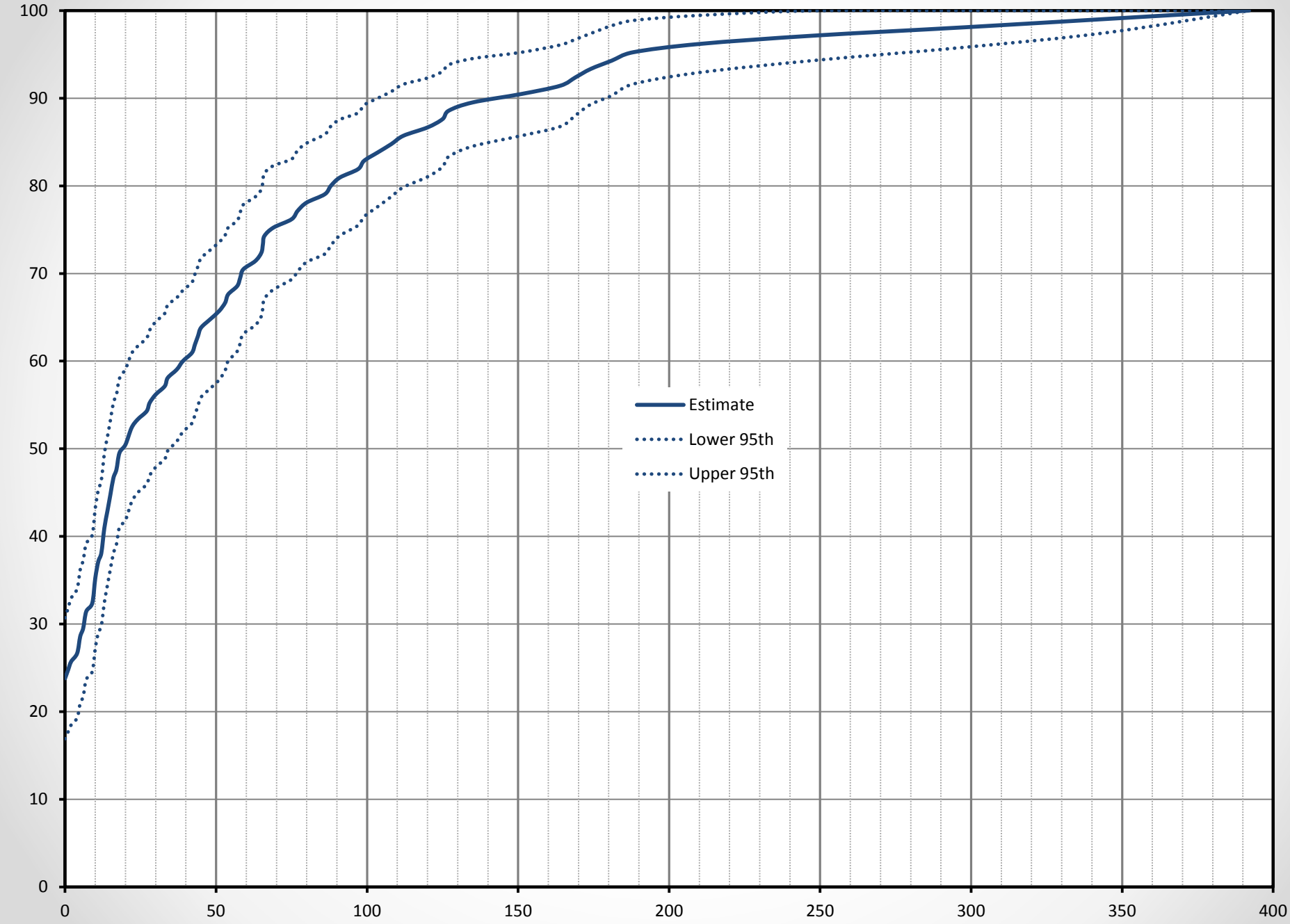
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