Conference on "Risk Assessment and Ranking of Risks in European Food Safety Systems"

National Food Sampling Plan: risk-based and random

28th november

Economic and Food Safety Authority

ASAE

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MINISTRY OF RURAL DEVELOPMENT & FOOD
EFET
HELLENIC FOOD AUTHORITY

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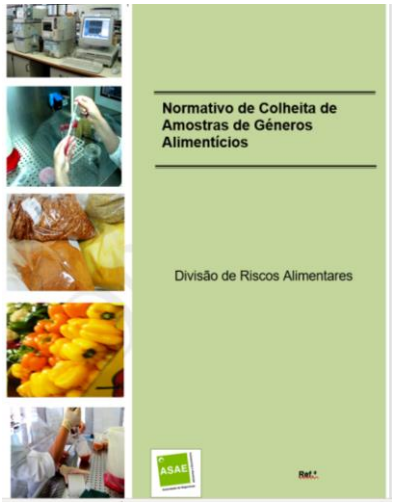
EUROPEAN FOOD SAFETY AUTHORITY

National Food Sampling Plan

(Plano Nacional de Colheita de Amostras - PNCA)

Objective:

- ✓ Warrant that the <u>Food</u> in the market is **SAFE**
- ✓ Safeguard the interests of consumers
  - ✓ **Labelling**
  - ✓ **Fraudulent practices**



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National Food Sampling Plan

(Plano Nacional de Colheita de Amostras - PNCA)

Monitoring Process

Retail

1500 Samples — **Monitoring of Risk Exposure**

300 Samples — **Consumer information**

Total 1800 Samples

≈18 000 Analytical determinations

13 Groups of foods

1500 Samples

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National Food Sampling Plan

(Plano Nacional de Colheita de Amostras - PNCA)

13 Food groups

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Risk-based Sampling

RISK MATRIX

Nível Ocorrência		Severidade				
		Mínima (1)	Baixo (2)	Moderada (3)	Alta (4)	Muito Alta (5)
	Muito Alta (5)	Baixo	Moderado	Alto	Alto	Muito Alto
	Alta (4)	Baixo	Moderado	Moderado	Alto	Alto
	Moderado (3)	Baixo	Moderado	Moderado	Alto	Alto
	Baixo (2)	Baixo	Baixo	Moderado	Moderado	Alto
	Mínima (1)	Muito Baixo	Baixo	Baixo	Moderado	Alto

Ranks food groups in relation to the risk on a qualitative scale

+

(RPN – Risk Priority Number)

$NPR = G \times O \times D$ x **Food Consumption**

ian:af INQUÉRITO ALIMENTAR NACIONAL E DE ATIVIDADE FÍSICA

G = Severity Index or Degree of Risk of identified hazards associated with foodstuffs;

O = Occurrence Index of the previous year;

D = Detection Index or probability of detecting the hazard.

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Risk-based Exposure

Group	NPR	(2NPR+C)/3	Proportion	Anual sampling n'i 2024
Meat and processed meat	320	407	0,147	221
Fishery Products	320	288	0,104	156
Dried fruit	280	200	0,072	109
Dairy products	240	378	0,137	205
Cereals and all products derived from cereals	200	404	0,146	219
Fruit and vegetables	168	570	0,206	309
Non-alcoholic beverages	100	311	0,112	169
Ready-to-eat foods	40	41	0,015	22
Spices, condiments and sauces	40	46	0,016	25
Oil and fat	32	39	0,014	21
Sweets and honey	32	39	0,014	21
Eggs and Egg products	24	19	0,007	11
Alcoholic beverages	24	23	0,008	13
	1820	**2765**	**1,000**	**1500**

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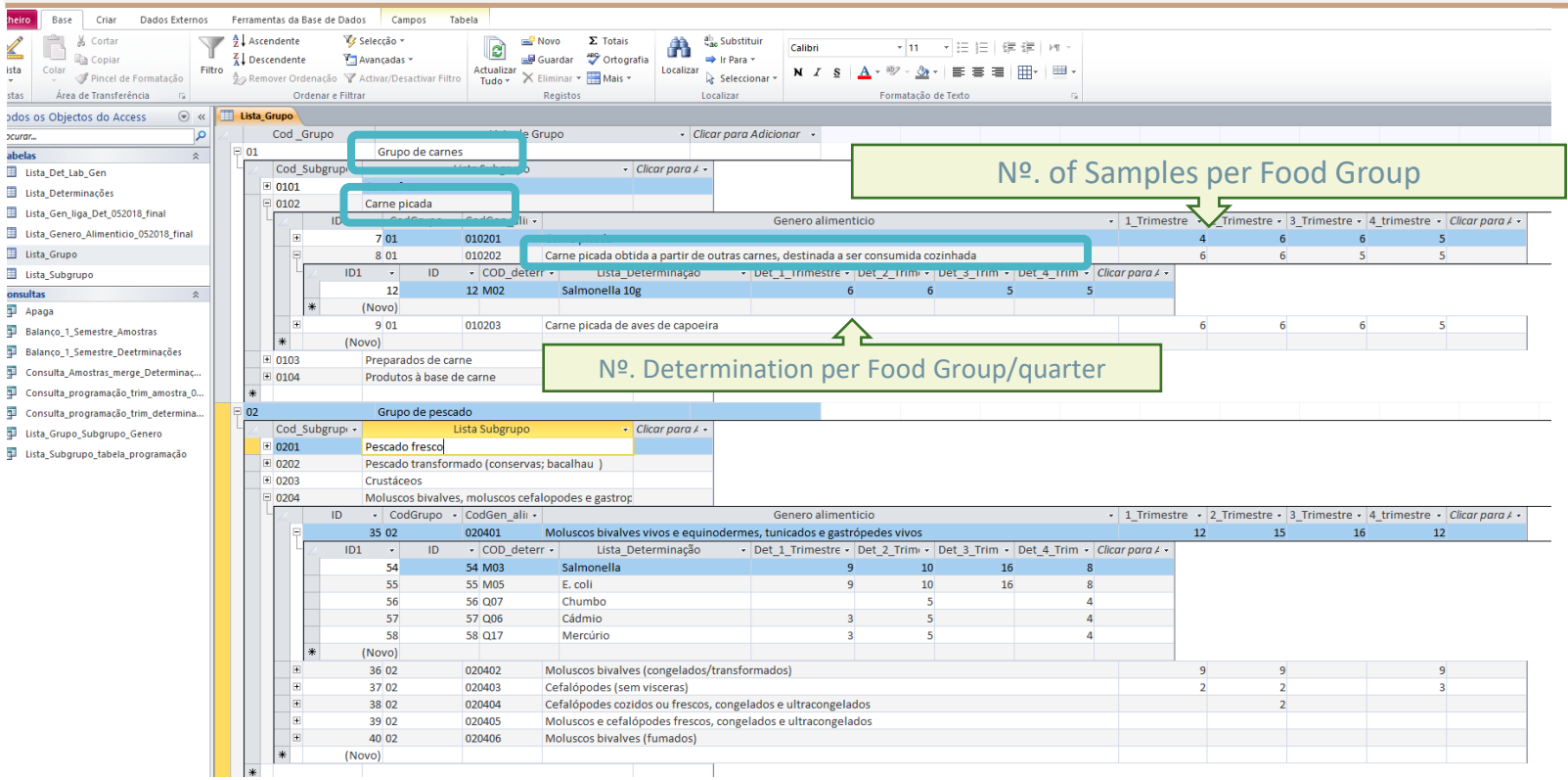
RASFF

Risk-based Programming

ACESS –Distribution of samples to collect/lab. determinations



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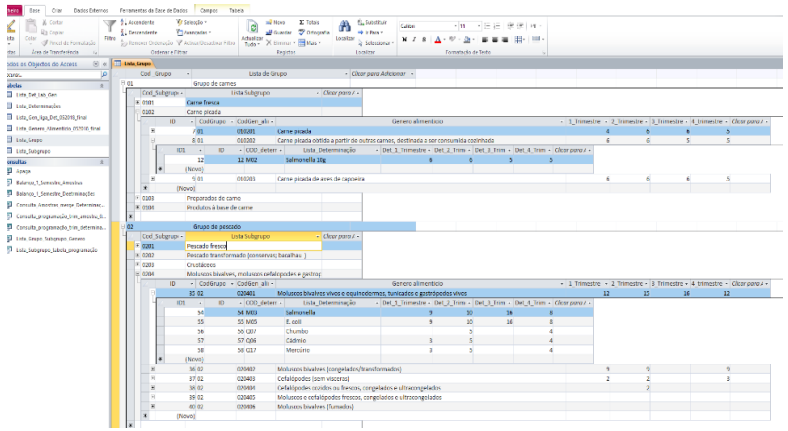
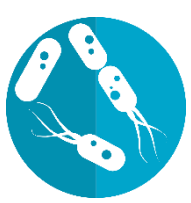
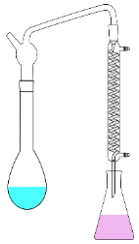
Risk-based vs **Random**

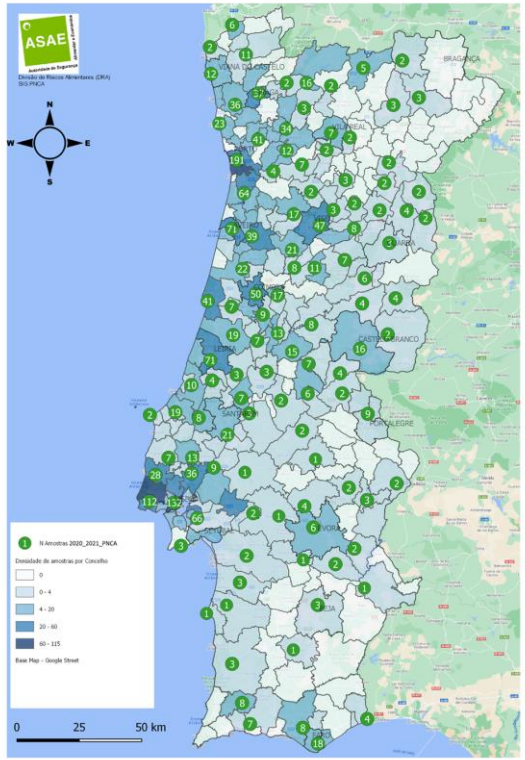
ACESS – launching the quarterly distribution of samples/determinations







Launch of the Operations Order: Sample Collection



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Risk-based goals of the activity

The purpose is to **minimize risk to consumer health**

Risk considerations have an influence on:

- The sample size for the different food subgroups
- Analytical scope

The intention is:

- ✓ Increase the control of High-Risk Food Groups: with more noncompliance + more severe violations + more consumed;
- ✓ Non compliances trigger risk management measures => reduce the rate of non-compliance of products on the market and thus increase consumer safety

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Representative goals of the activity

- Within a food subgroup and for a fixed analytical determination, the selection of the units (places where samples are taken + commodities themselves) is **random**.
- Samples must be taken in the entire country (all districts)

  - ✓ Generate a population estimate of NC rates of food groups on the market + analyze trends over the years.
  - ✓ Produce an overall violation rate and analyze trends over the years;
  - ✓ Results are used in risk assessment, exposure assessment and to evaluate/identify high risk groups for the following year's plan (use previous 5-6 years' results).

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Situation

- Total fixed sample size (1500 for monitoring of risk exposure)
- 13 food groups with 52 subgroups
- Risk-based allocation of overall sample size to food groups using a mixed weighting scheme including
  - risk priority number
  - consumption
- (Near) random sampling within groups
- Equal spread over districts assumed

Questions

How representative is the plan given the number of samples available per year?

Is the overall sample size enough?

What is a lower bound that must not be exceeded (red line)?

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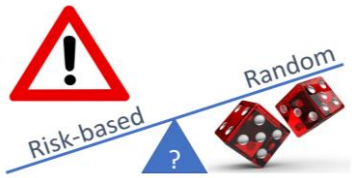
- ✓ Calculate sample size using risk-based allocation
- ✓ For every (sub-) group compute precision/power/error margin etc. that can be achieved given the sample size
- ✓ Check if acceptable



Formula to calculate the sample size and accuracy of proportion estimates:
calculate the sample size / width of confidence interval (CI).

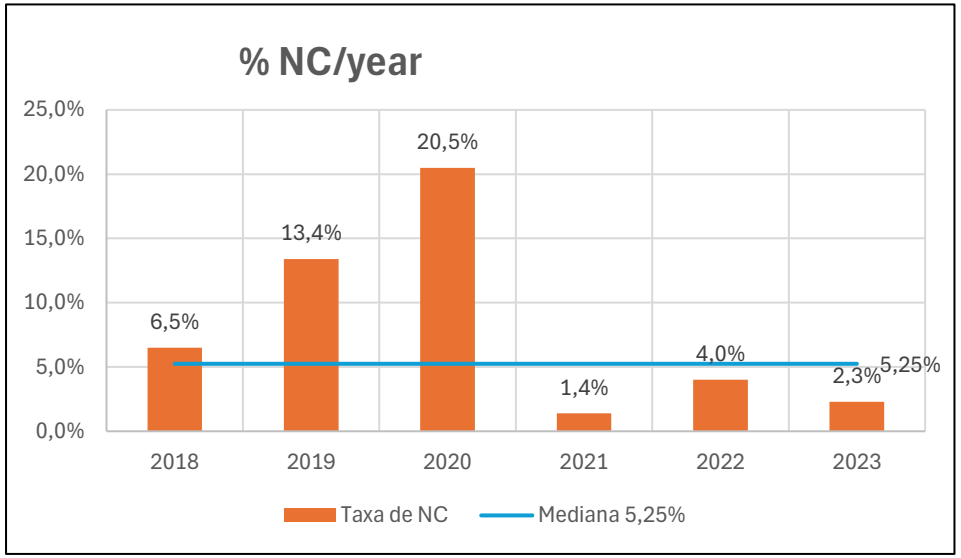
	A	B	C
1	Sample size for given confidence level and CI width		
2			
3	Expected proportion	5,25%	
4	Width of CI	10,00%	
5	Confidence level	95%	
6			
7	**Sample size**	**77**	
8			
9			
10			
11	**Interpretation**		
12	To estimate a true proportion, based on an expected proportion of 5,3%, with a 95% confidence level and a confidence interval width of 10%, you need a sample size of 77.		
13			

	A	B	C	D
1	CI width for given sample size and confidence level			
2				
3	Expected proportion	5,25%		
4	Confidence level	95%		
5	Sample size	94		
6				
7	**Width of CI**	**9,02%**		
8				
9				
10				
11	**Interpretation**			
12	Given an expected proportion of 5,3%, a confidence level of 95%, and a sample size of 94, you will produce a proportion estimate with a confidence interval width of 9,02%, assuming the expected proportion is accurate.			
13				
14				
15				




Sulfits in meat products

Year	Samples	Non-compliant (NC)	NC rate
2018	46	3	6,5%
2019	67	9	13,4%
2020	39	8	20,5%
2021	69	1	1,4%
2022	126	5	4,0%
2023	87	2	2,3%



https://www.fedup.com.au/images/stories/sulphitestripall.jpg




How accurate is the estimate?

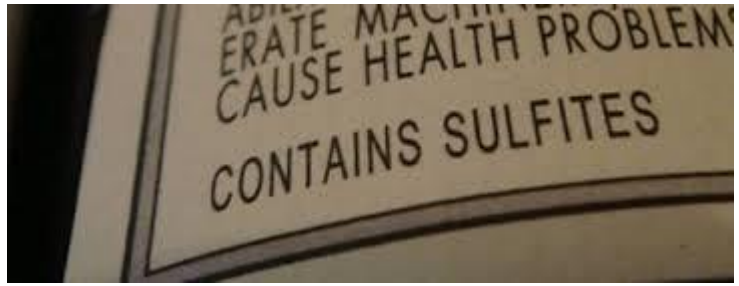
- Considering the non-compliance rate of 5.25%

What sample size would I need?

	Confidence level		
width CI	90%	95%	99%
2%	1346	1911	3301
5%	216	306	529
10%	54	77	133
20%	14	20	34

What accuracy can I achieve?

		Confidence level		
Year	Samples	90%	95%	99%
2018	46	10,82%	12,89%	16,94%
2019	67	8,96%	11,80%	14,04%
2020	39	11,75%	14,00%	18,40%
2021	69	8,83%	10,53%	13,83%
2022	126	6,54%	**7,79%**	10,24%
2023	87	7,87%	**9,37%**	12,32%



2020 to 2023

15%
n=194

Risk-based vs Random Tool

Sample size for given confidence level and CI width

Expected proportion	15,00%
Width of CI	10,00%
Confidence level	95%
Sample size	**196**

Interpretation
To estimate a true proportion, based on an expected proportion of 15%, with a 95% confidence level and a confidence interval width of 10%, you need a sample size of 196.

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