

Causes of death and exceptional longevity in Ikaria and the Sardinian Blue Zone

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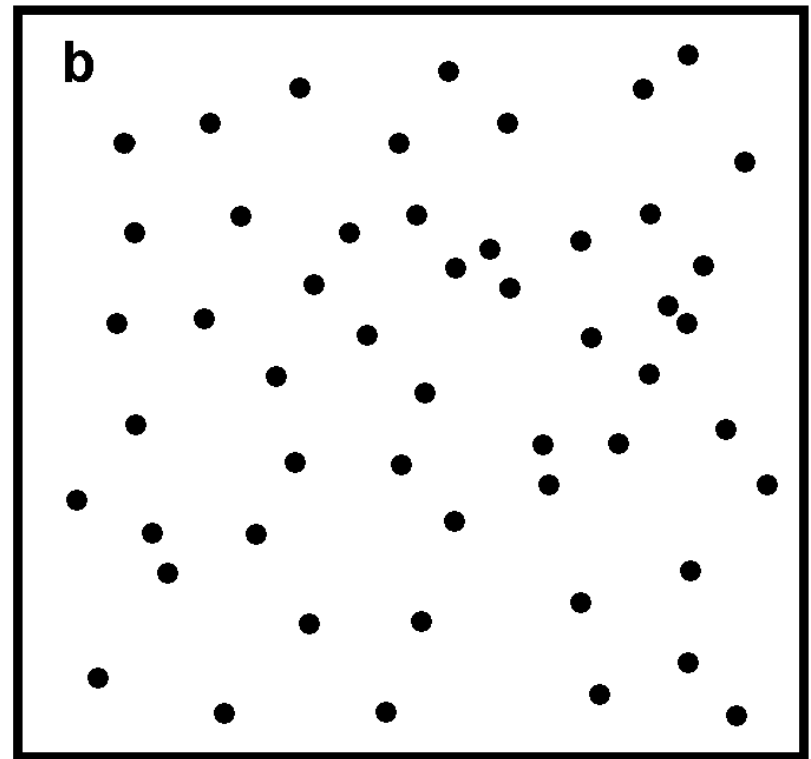
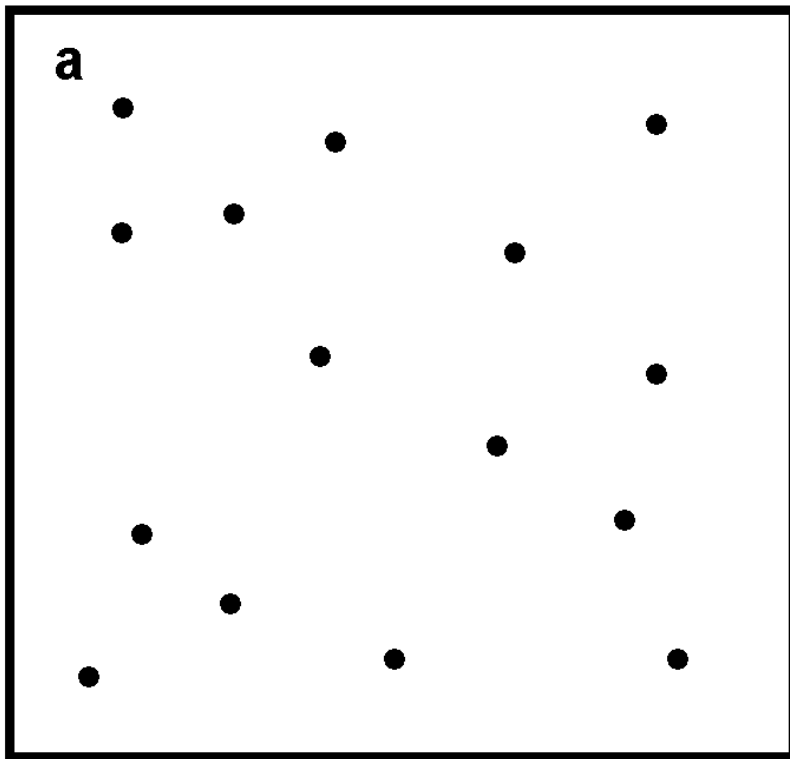
Aim of our contribution

Identify and compare causes of death in populations with the exceptional longevity in Ikaria (Greece) and the mountainous region of Sardinia

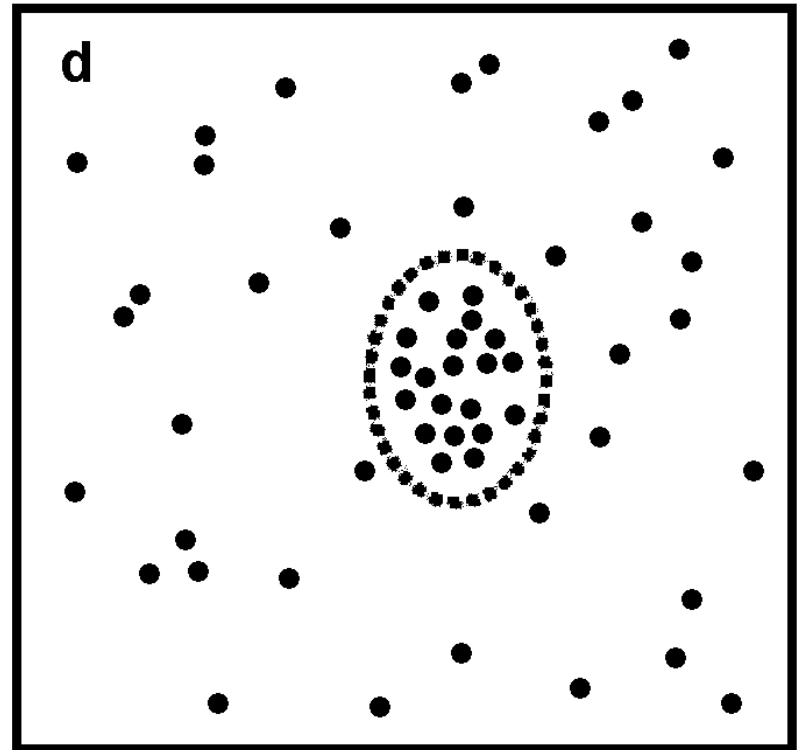
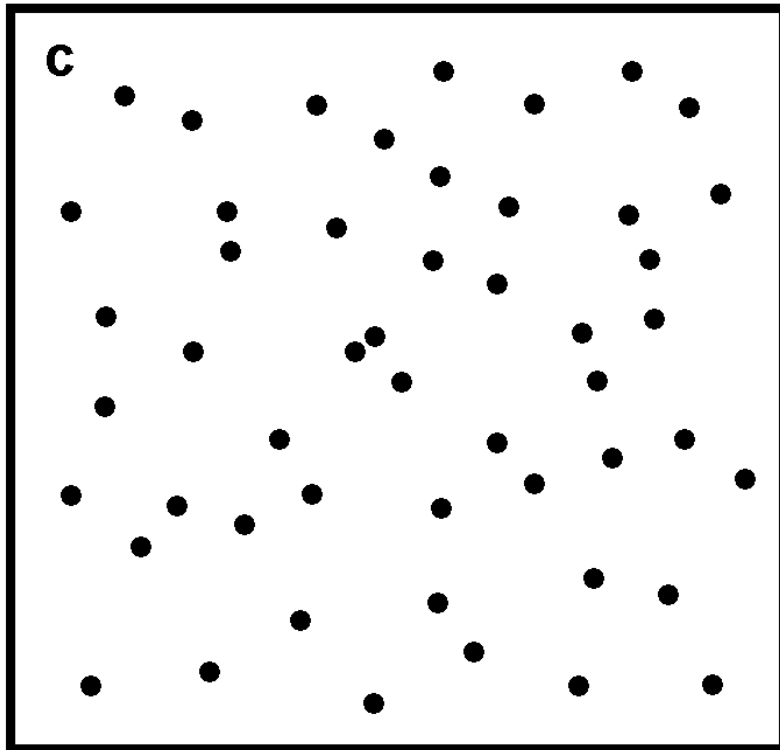
Literature review

- Atlas on mortality at municipality level for Sardinia published in the '90.
- SMR by causes of death published by Caselli and Lipsi (2002) on all Italian provinces.
- Caselli and Lipsi (2006) pointed out the close relation between the BZ and the area with lower CDV diseases and cancers.

Spatial distribution of centenarians: (a) low prevalence (b) high prevalence



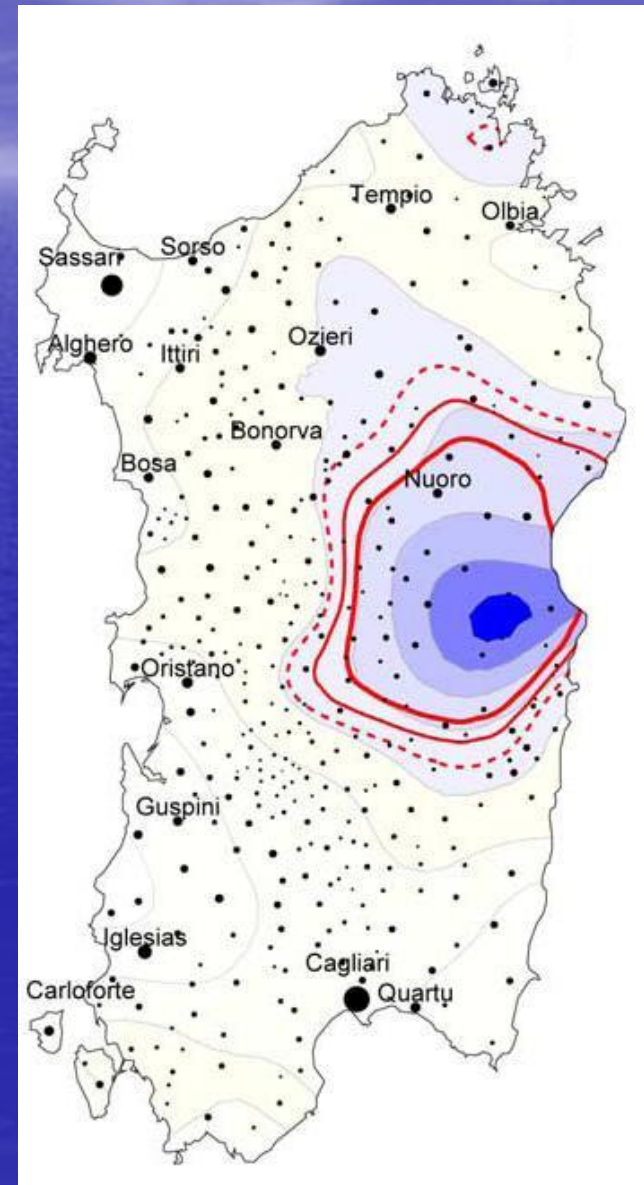
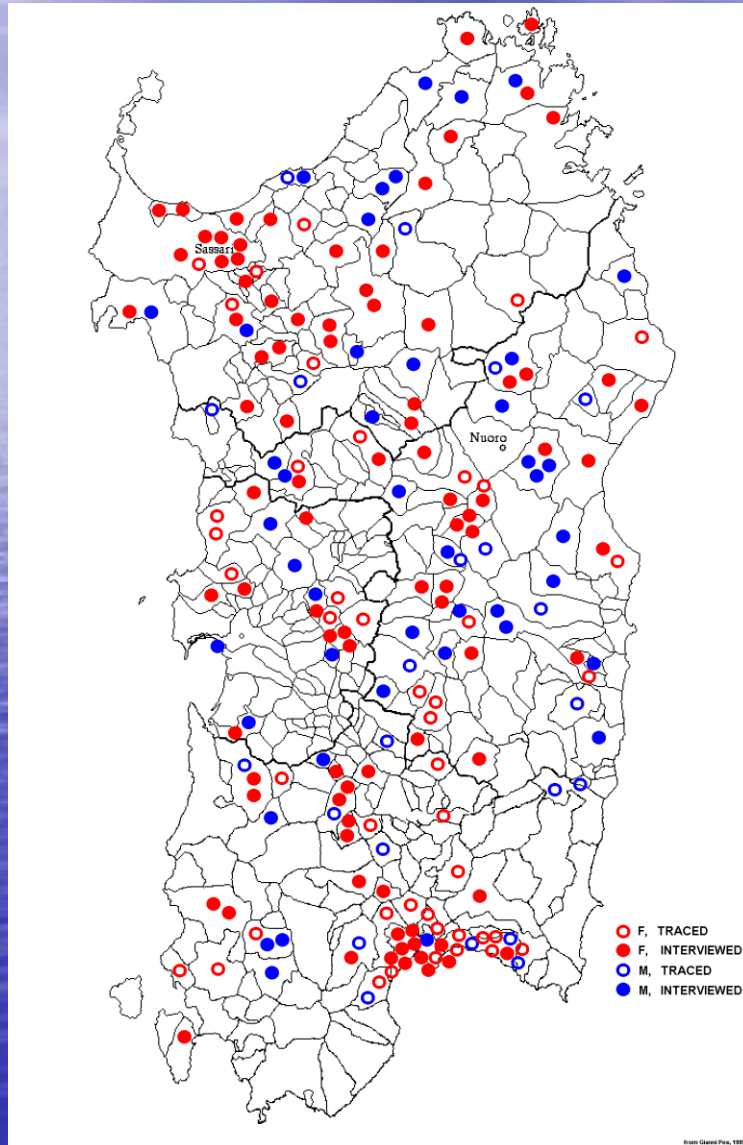
Spatial distribution of centenarians:
(c) random = individual longevity
(d) non random = population longevity



Population longevity versus individual longevity...

A better chance to discover the longevity determinants as common factors are controlled and also epigenetics might give better explanations compared to genetics.

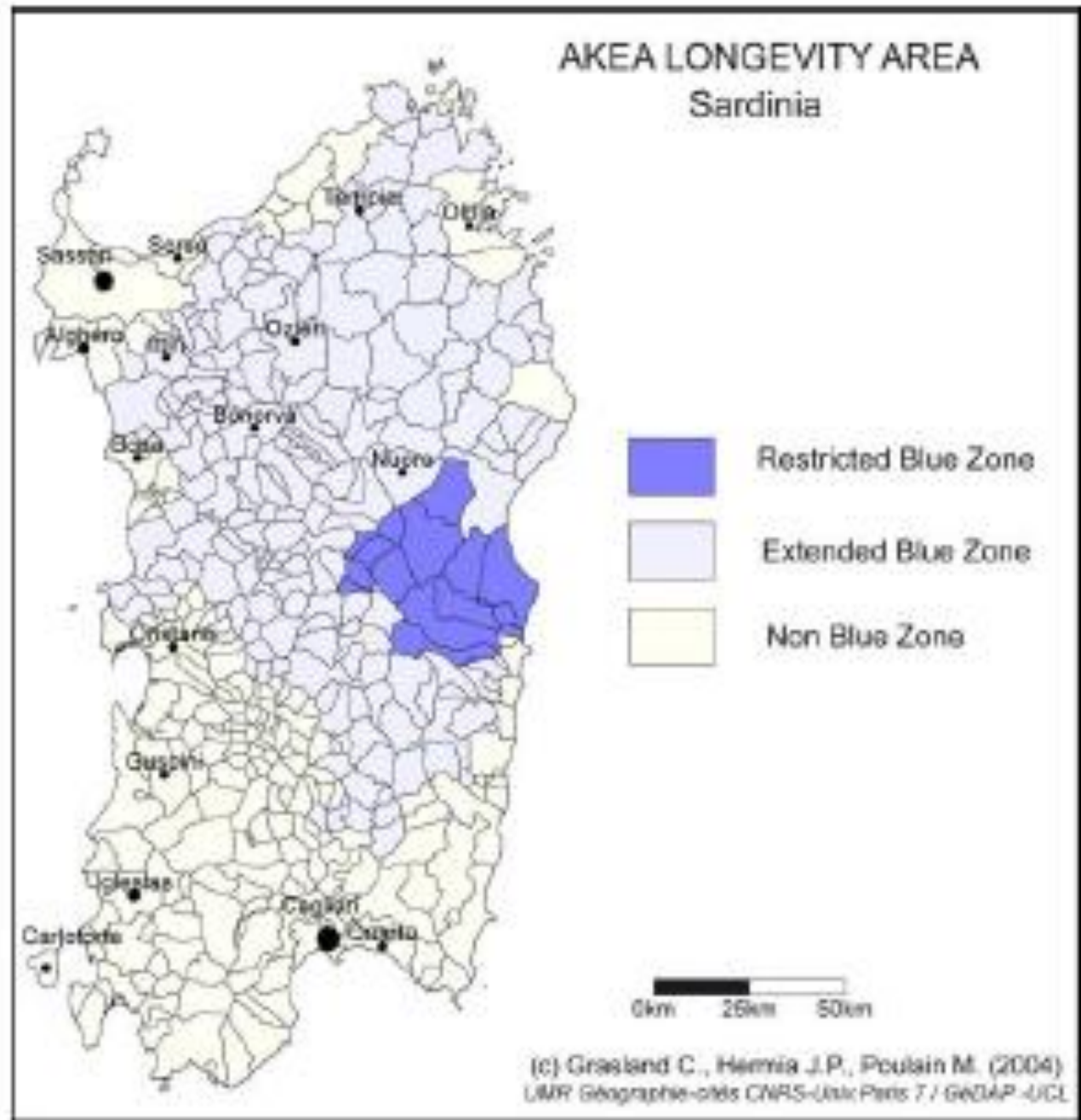
The Sardinian Longevity Blue Zone



Restricted
Blue Zone
(RBZ)

Large Blue
Zone (LBZ)

Non Blue
Zone
(NBZ)



CHARACTERISTICS OF THE BZ

| | RESTRICTED BLUE ZONE (RBZ) | LARGE BLUE ZONE (LBZ) | REST OF SARDINIA (NBZ) |
|--|----------------------------------|-----------------------------|------------------------------|
| Number of communes | 14 | 188 | 189 |
| Population in 2001 | 42,000 | 432,000 | 1,200,000 |
| Average altitude | 588 | 417 | 142 |
| Number of centenarians born in 1880-1900 | 90 | 635 | 497 |
| Sex ratio | 0.94 | 1.35 | 2.43 |
| Life expectancy for men 80+ | 8.7 | 8.2 | 7.3 |



IKARIA

Three municipalities
and 8,000 inhabitants



4 Blue Zones



The data : causes of death by commune for the whole Sardinia

PERIOD : 1982-2001.

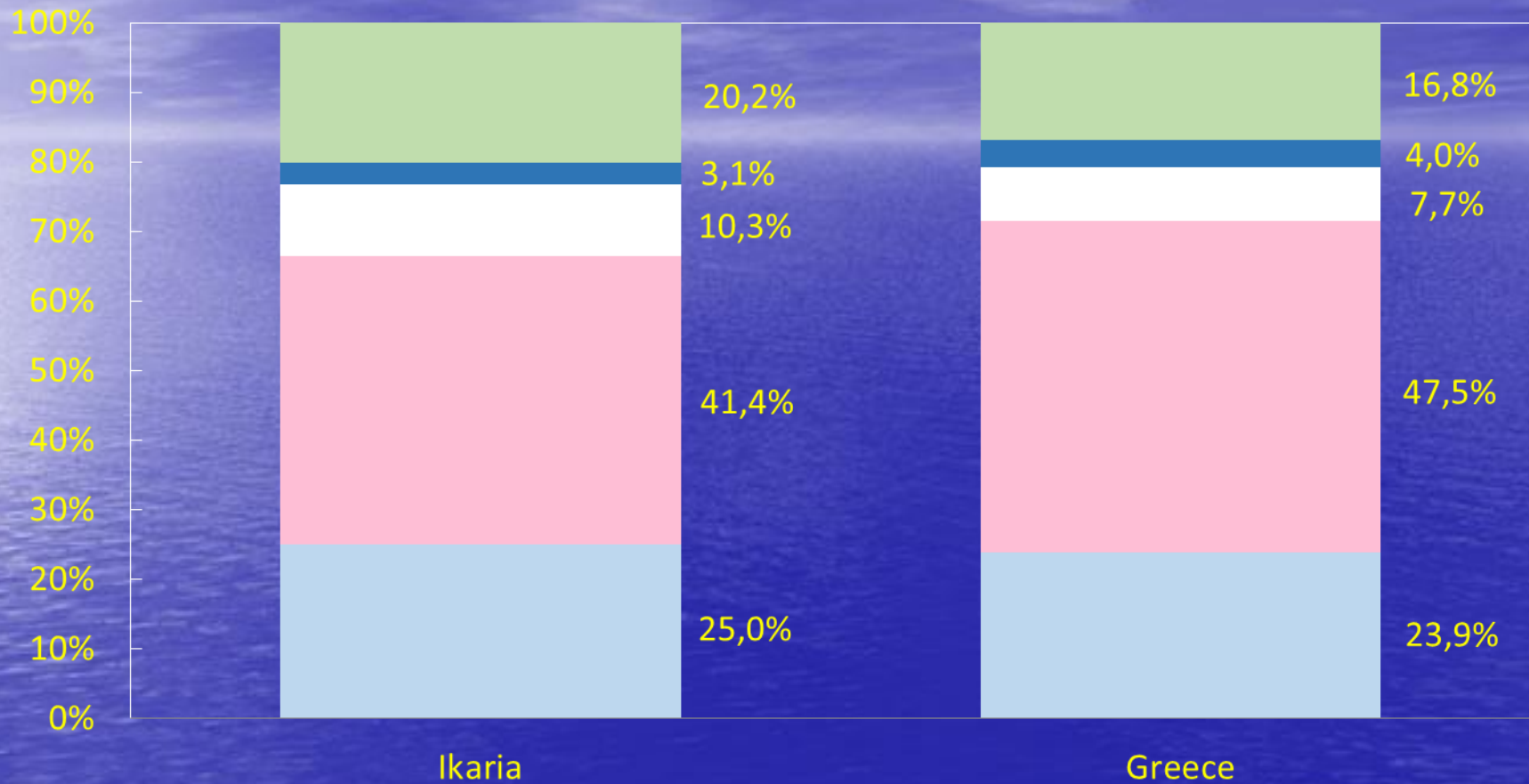
5 year-age groups up to 85 years and over
6 large groups of causes of death :

- Group 1: infectious and parasitical diseases;
- Group 2: Cancers.
- Group 3: Cardiovascular system diseases.
- Group 4: Respiratory system diseases
- Group 5: Other causes
- Group 6: Accidental and poisoning deaths

Causes of death in Ikaria and Greece 2000-2007

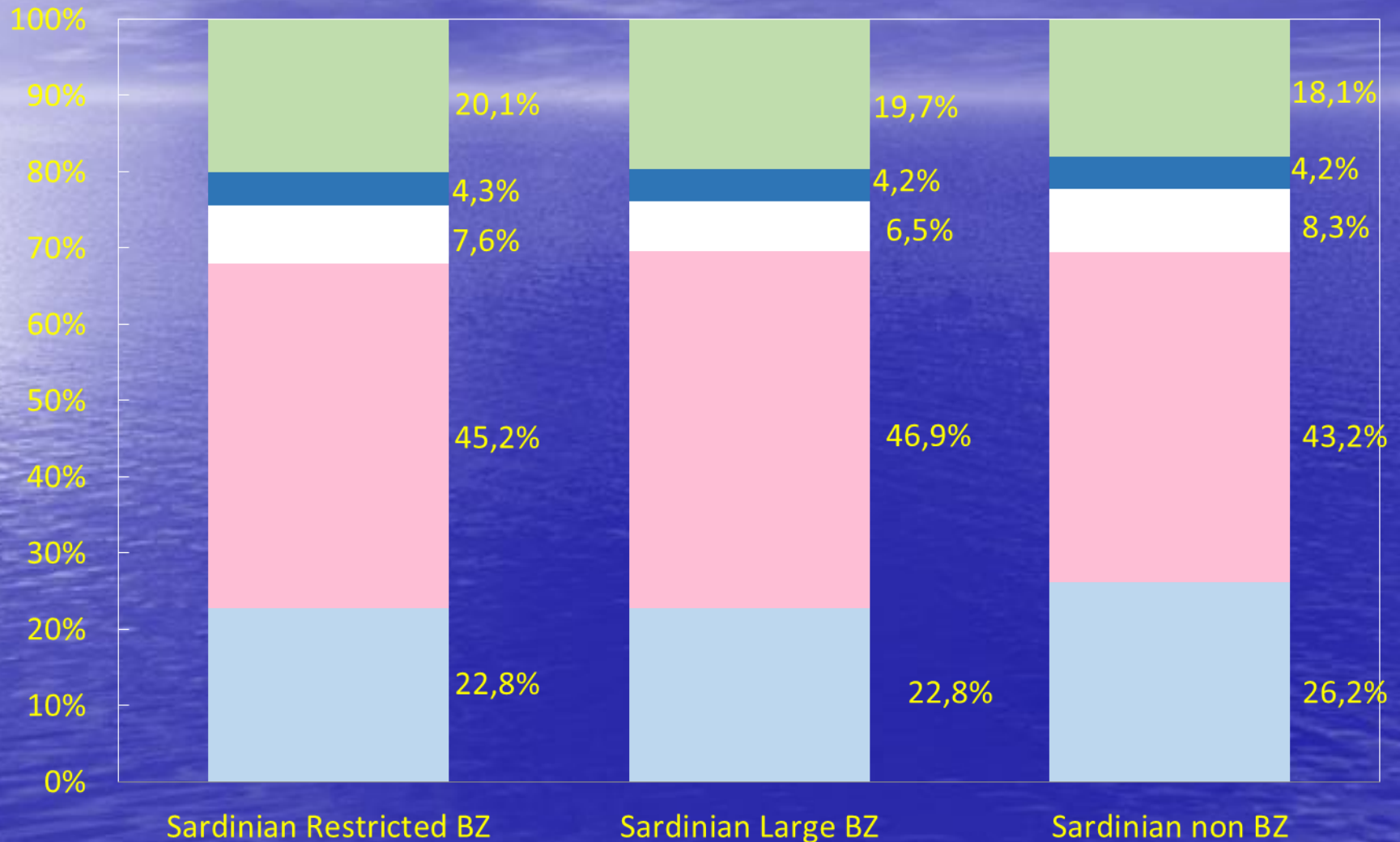
| Causes of death | Absolute numbers | | | Proportions | | |
|---|------------------|-------------|----------------|-------------|-------------|--------------|
| | Ikaria | Samos | Greece | Ikaria | Samos | Greece |
| Cancers | 212 | 769 | 201.301 | 25.0% | 22.5% | 23.9% |
| Cardiovascular diseases | 228 | 1051 | 252.245 | 26.9% | 30.8% | 30.6% |
| Cerebrovascular diseases | 123 | 537 | 142.573 | 14.5% | 15.7% | 16.9% |
| Diseases of the respiratory system | 87 | 218 | 65.020 | 10.3% | 6.4% | 7.7% |
| Diseases of the digestive system | 21 | 85 | 19.925 | 2.5% | 2.5% | 2.4% |
| Other causes | 39 | 243 | 56.808 | 4.6% | 7.1% | 6.7% |
| Violent causes | 26 | 144 | 33.495 | 3.1% | 4.2% | 4.0% |
| Unknown causes | 111 | 392 | 65.208 | 13.1% | 11.5% | 7.7% |
| TOTAL | 847 | 3413 | 842.575 | 100% | 100% | 100% |

Share of deaths by principal causes (Ikaria - Greece)



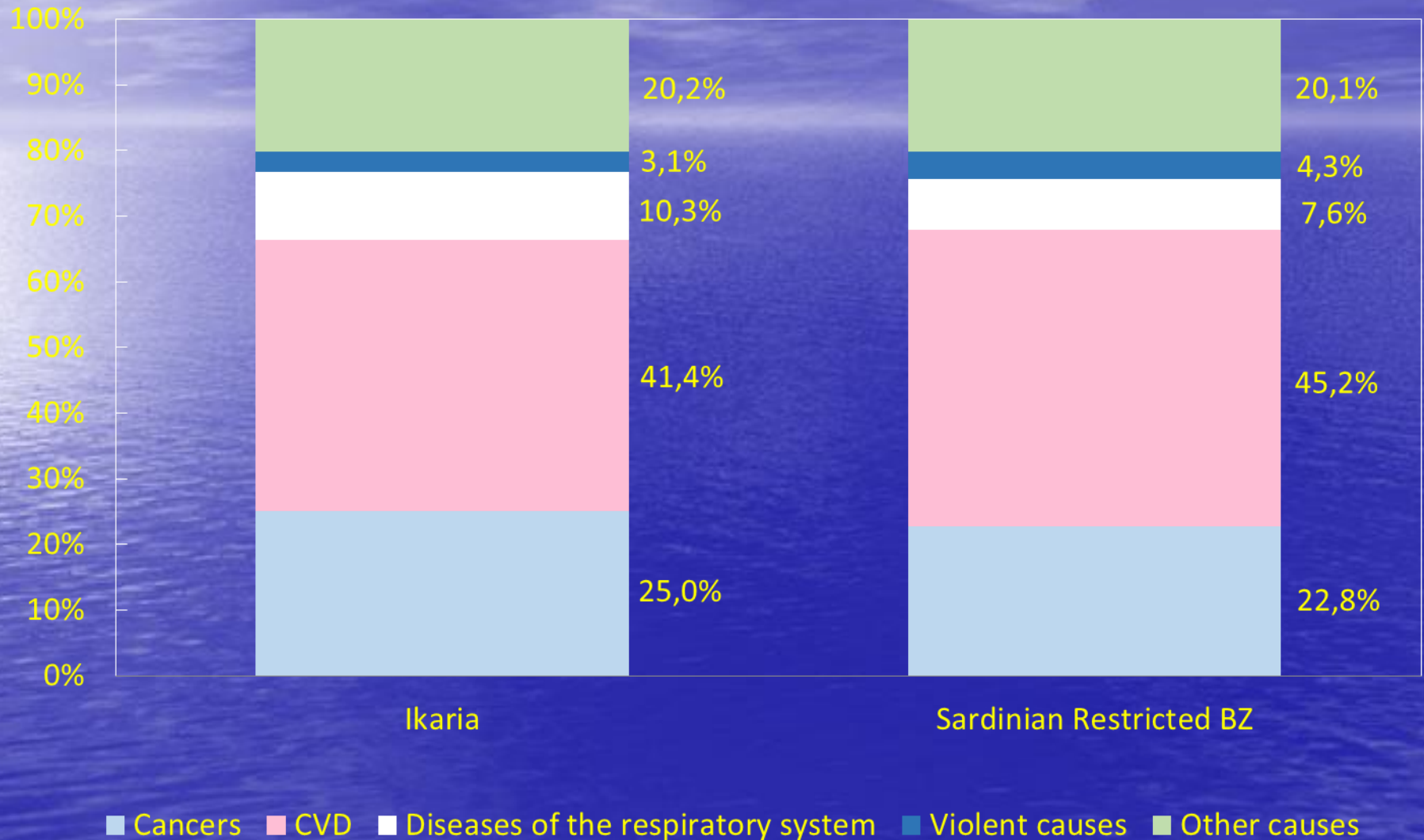
■ Cancers ■ CVD ■ Diseases of the respiratory system ■ Violent causes ■ Other causes

Share of deaths by principal causes (Sardinia)

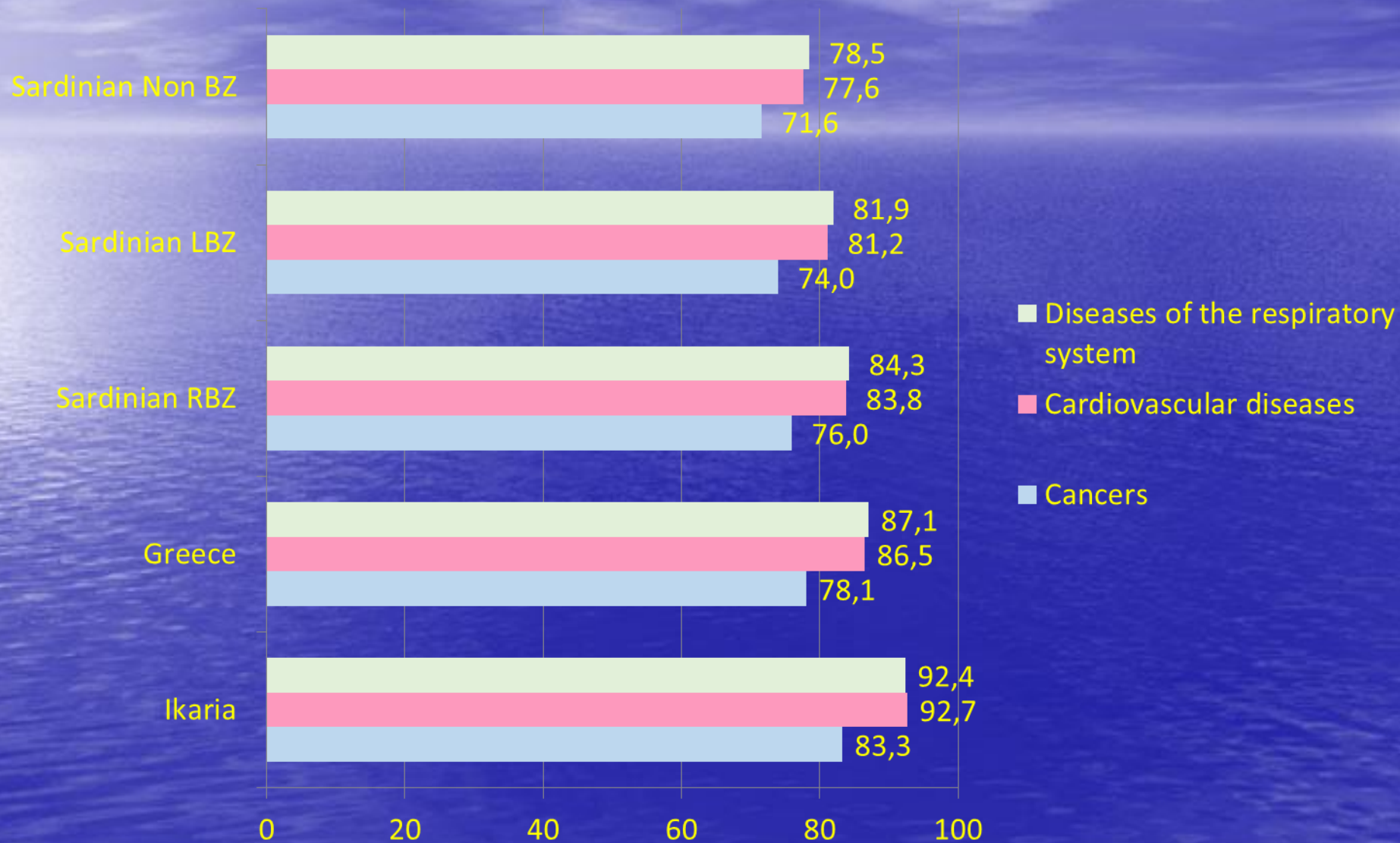


■ Cancers ■ CVD ■ Diseases of the respiratory system ■ Violent causes ■ Other causes

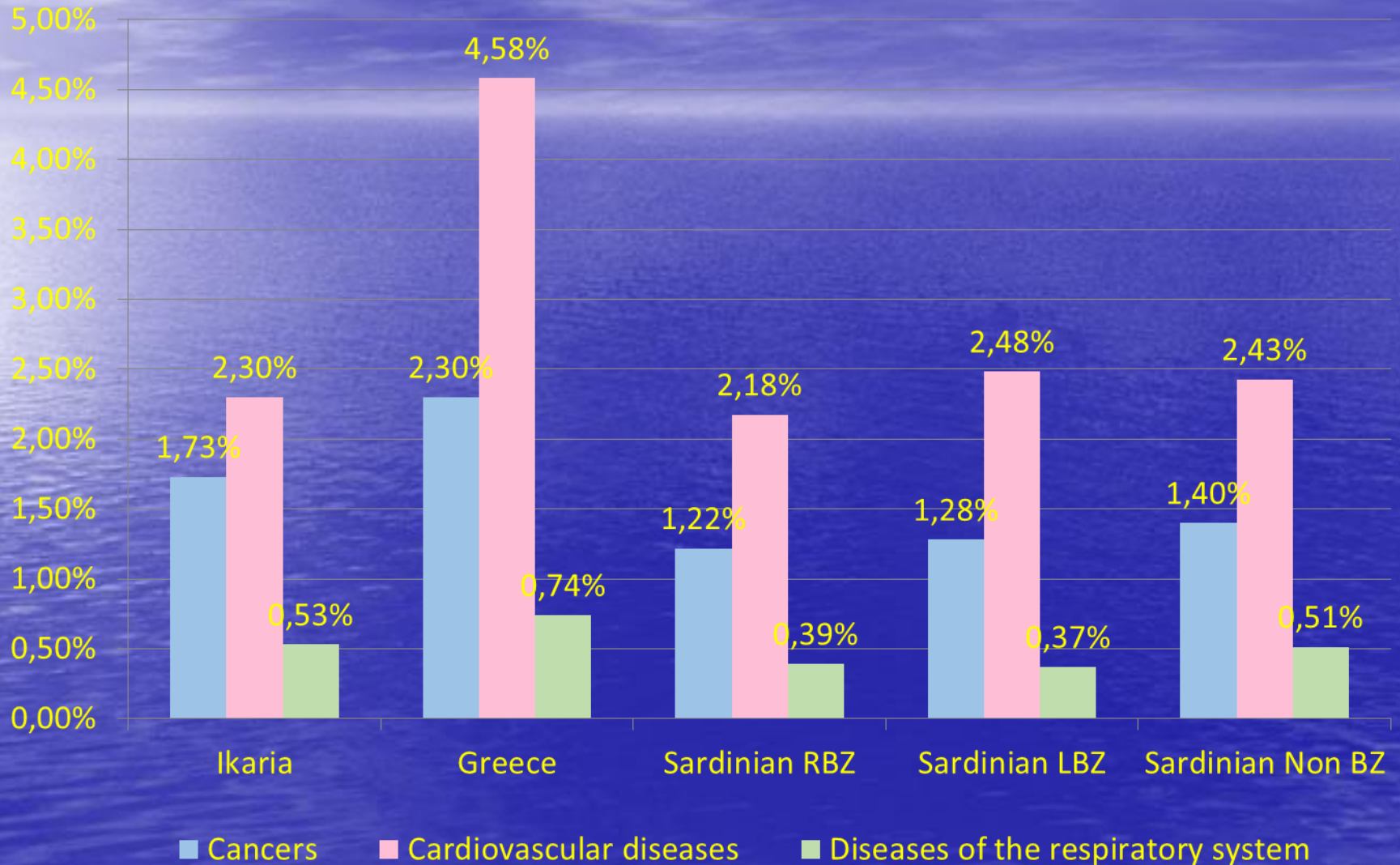
Share of deaths by principal causes (Ikaria - Sardinia)



Mean age at death by causes (Ikaria - Sardinia)



Standardised mortality rates (Ikaria - Sardinia)



Standardised mean age at death by cause and gender in Sardinia

| Standardised mean age at death by causes and gender (Sardinia) | RBZ Males | Non BZ Males | RBZ Females | Non BZ Females |
|--|-----------|--------------|-------------|----------------|
| Cancers | 69,81 | 69,53 | 71,41 | 70,61 |
| CVD | 74,06 | 74,61 | 77,26 | 77,66 |
| Diseases of the respiratory system | 75,34 | 74,98 | 78,52 | 77,94 |
| Violent causes | 72,31 | 73,66 | 76,25 | 76,96 |
| Other causes | 66,71 | 70,14 | 76,83 | 76,93 |

Discussion (1)

Comparing BZ and non BZ

- Standardisation by age is crucial for comparing BZ and non BZ
- SMR by cancer and CVD are lower in BZ compared to non BZ
- Standardised ages at death by specific cause do not show significant differences
- Oldest olds in Ikaria and Sardinian BZ should probably better be considered as ESCAPERS than DELAYERS

Discussion (2) : Comparing Ikaria and Sardinian BZ

- More **cancers** in Ikaria compared to Sardinia that could be linked to larger prevalence of **tabagism in** Ikaria : 8% of active smokers among the 90+ and 47% were smokers in the past.
- More deaths due to respiratory diseases in Ikaria and for that point the important radioactivity has also to be mentioned in addition to smoking.

Discussion (3): Comparing Ikaria and Sardinian BZ

- More death attributed to CVD in Sardinia compared to Ikaria despite of important risk factors observed in the latter (hypertension, diabete, tabacco).
- Important level of physical activity recorded in both populations but better adherence to the mediterranean diet in Ikaria and more robust people (handgrip force is 17 ± 6 kg for women in Ikaria and 27 ± 8 kg for men, nearly the double compared with Italian of the same age).

IKARIA & SARDINIA

Places where people take time to live and to die...



THANKS