Functional Limitation Patterns and Determinants Across Mid- and Early-Late Life Among a High Fertility Cohort of Women
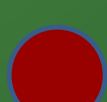
Zachary Zimmer (UCSF)
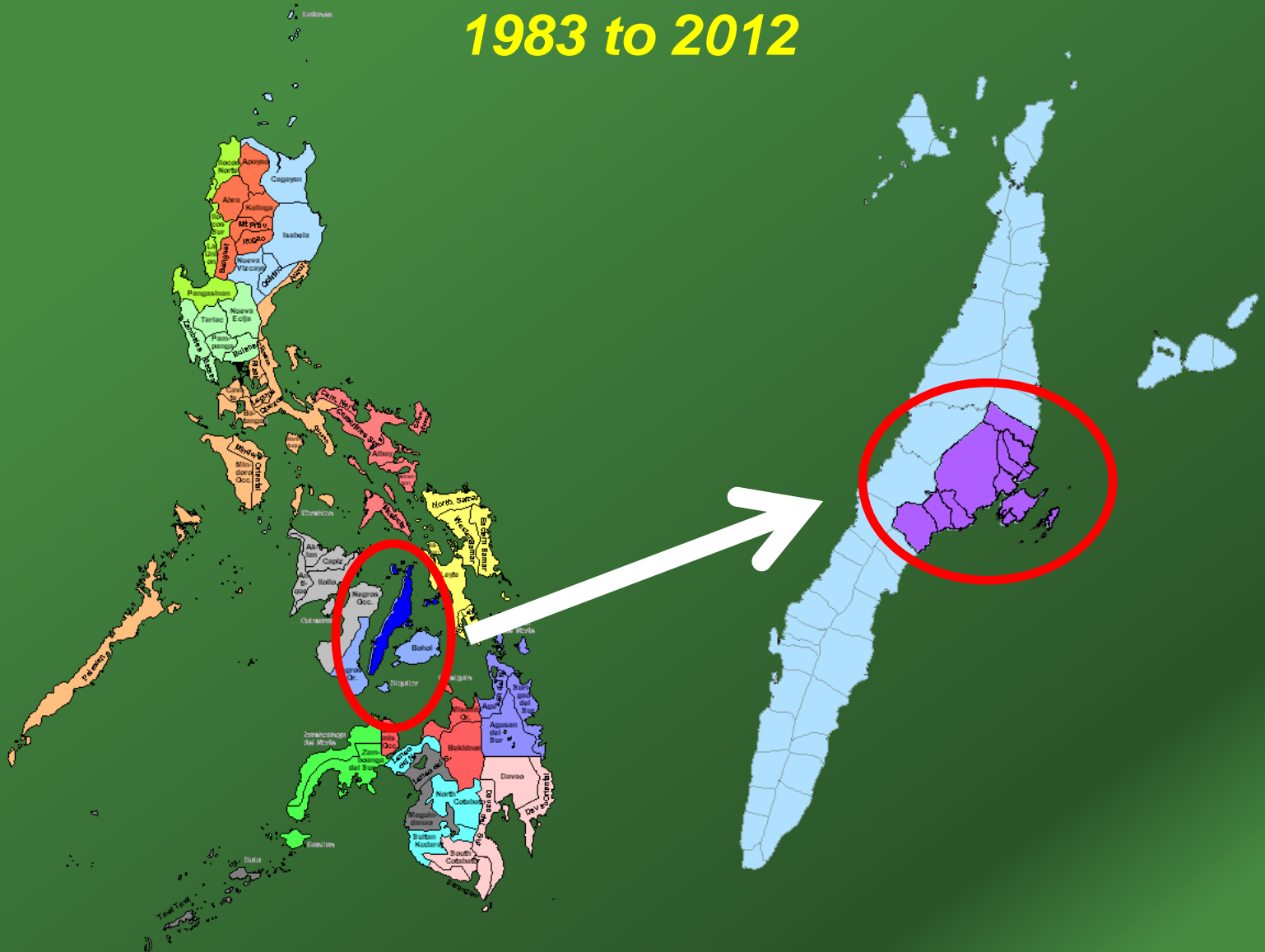Luoman Bao (U. Maryland)
Tita Lorna Perez (U. San Carlos)
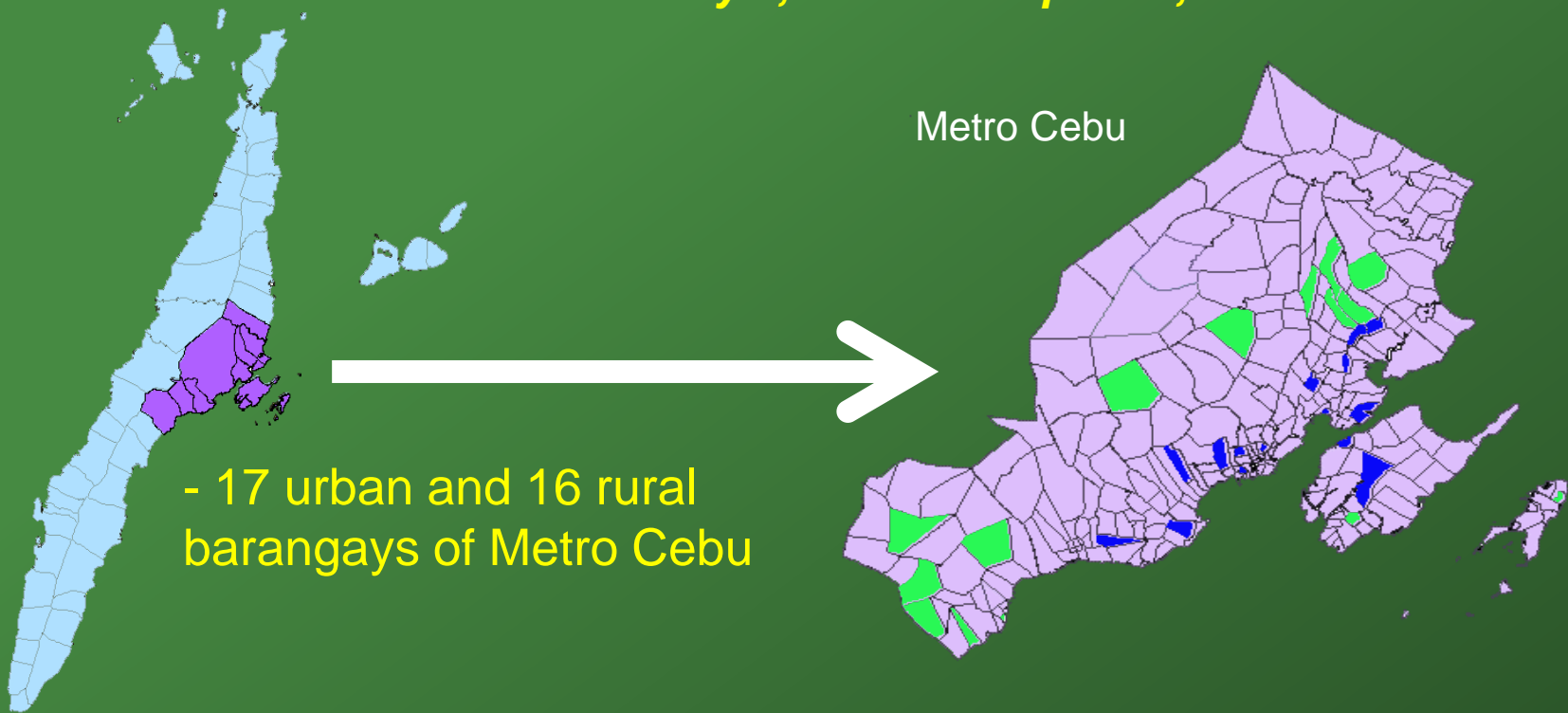Feinian Chen (U. Maryland)
Nanette L. Mayol (U. San Carlos)
Paulia L. Duazo (U. San Carlos)

Cebu Longitudinal Health and Nutrition Study: 1983 to 2012

Sample consists of a cohort of women that were pregnant in 1983 and gave birth between May 1, 1983 and April 30, 1984

Metro Cebu

- 17 urban and 16 rural barangays of Metro Cebu

Data collection points used in current study

Baseline

WAVE 1 **WAVE 2** **WAVE 3** **WAVE 4** **WAVE 5**

1983

1994 **1998** **2002** 2005 **2007** **2012**

Women recruited into sample. Completed first survey

First functional limitation measure

Last functional limitation measure
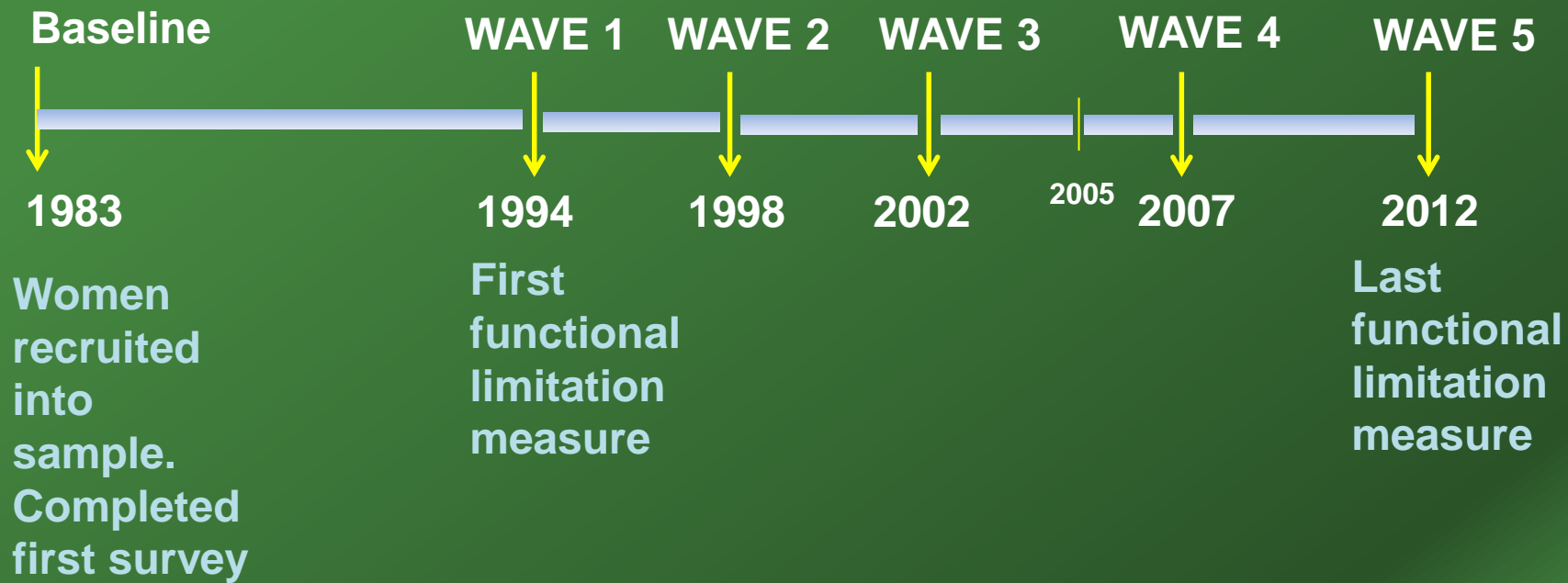
Age of birth cohorts at baseline, Wave 1 and 5, and sample sizes

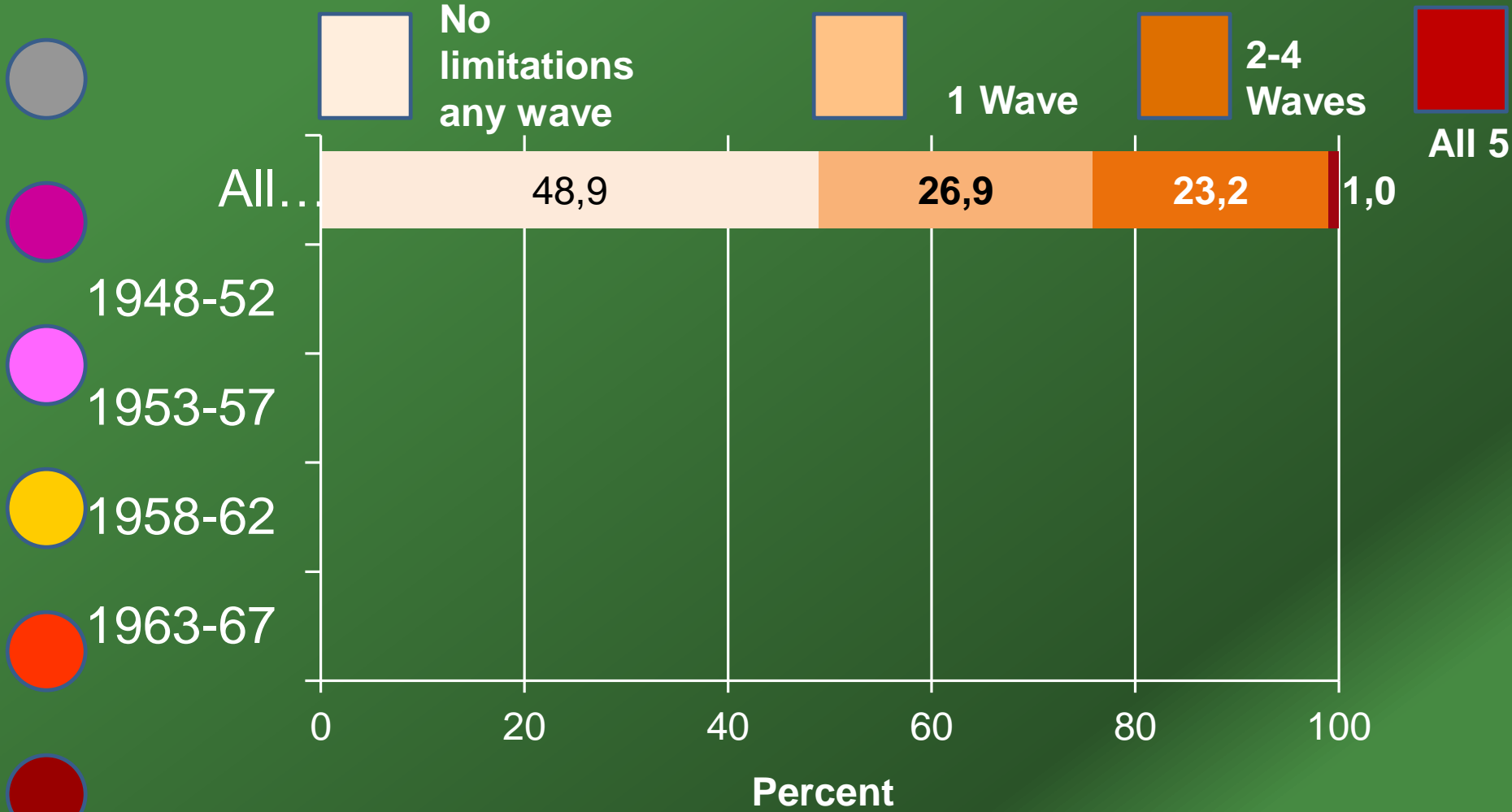|	Baseline	WAVE 1	WAVE 5	N
Birth cohort				
1963-67	16-20	27-31	46-50	230
1958-62	21-25	32-36	51-55	505
1953-57	26-30	37-41	56-60	442
1948-52	31-35	42-46	61-65	260

Total N   1,437

Functional limitation measure

Have difficulty with one of:

- **Walking a distance of 1 km**
- **Climbing a flight of stairs or walking up a hill**
- **Carrying a weight of 5 kg for a short distance**

Distribution of the number of waves in which a functional limitation is reported, by birth cohort

	No limitations any wave	1 Wave	2-4 Waves	All 5

All...	48,9	26,9	23,2	1,0

1948-52

1953-57

1958-62

1963-67

0   20   40   60   80   100

Percent

Distribution of the number of waves in which a functional limitation is reported, by birth cohort
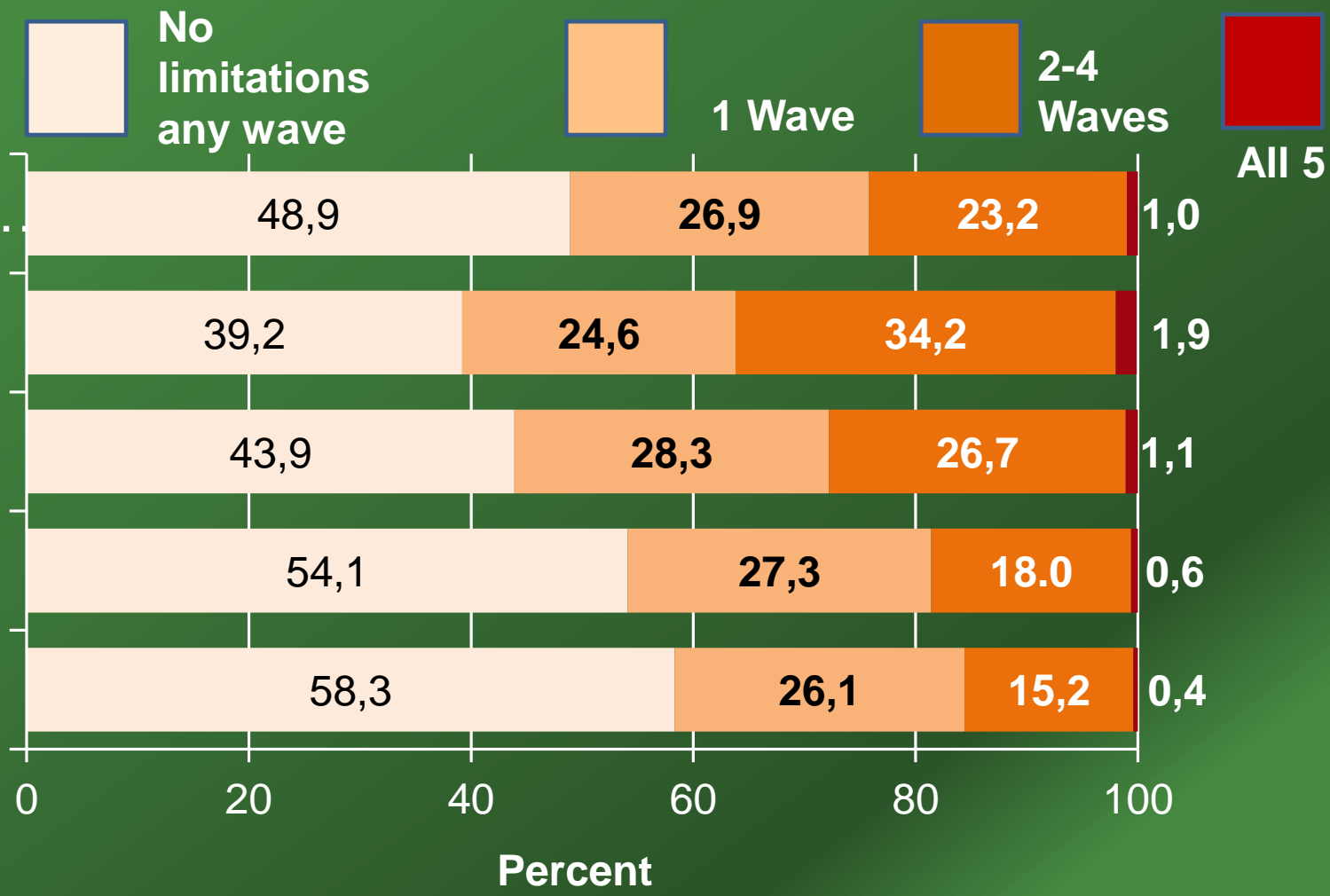
Distribution of patterns

Number of waves with a limitation	Wave					Percent
	1	2	3	4	5	
0						48.9
1					✓	4.0
				✓		9.9
			✓			3.4
		✓				5.1
	✓					4.5
2				✓	✓	2.7
			✓		✓	0.8
			✓	✓		1.3
		✓			✓	0.9
		✓		✓		2.9
		✓	✓			1.0
	✓				✓	0.4
	✓			✓		1.6
	✓		✓			1.0
	✓	✓				0.9
3			✓	✓	✓	1.0
		✓		✓	✓	1.0
		✓	✓		✓	0.6
		✓	✓	✓		0.8
	✓			✓	✓	0.9
	✓		✓		✓	0.1
	✓		✓	✓		0.1
	✓	✓			✓	0.6
	✓	✓		✓		0.8
	✓	✓	✓			0.8
4		✓	✓	✓	✓	0.8
	✓		✓	✓	✓	0.3
	✓	✓		✓	✓	0.3
	✓	✓	✓		✓	0.7
	✓	✓	✓	✓		0.8
5	✓	✓	✓	✓	✓	1.0
Total						100.0

Distribution of patterns for those reporting limitations in 2 waves

| Number of waves with a limitation	Wave					Percent
	1	2	3	4	5	
2				✓	✓	20.0
			✓		✓	5.9
			✓	✓		9.6
		✓			✓	6.7
		✓		✓		21.5
		✓	✓			7.4
	✓				✓	3.0
	✓			✓		11.9
	✓		✓			7.4
	✓	✓				6.7
TOTAL						100.0

Latent Class Analysis

- LCA Stata Plugin (Lanza et al., 2015)

- Underlying latent structures determined by a maximum likelihood procedure

- Best fitting structure based on goodness of fit

- Estimate probability that a woman in a give class will have a limitation in a given wave

- Estimate percent of sample in a given class

Probability of limitation by class and wave and percent in each class

Chronic - 7%

Onset/modulating - 26%

Little/no limitation - 67%
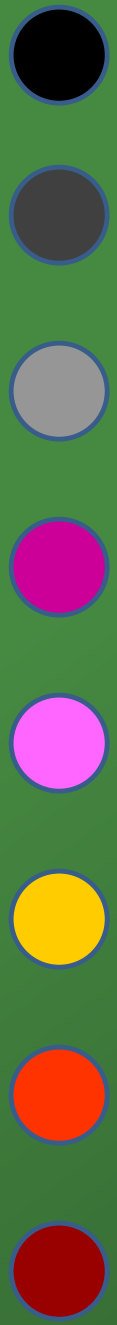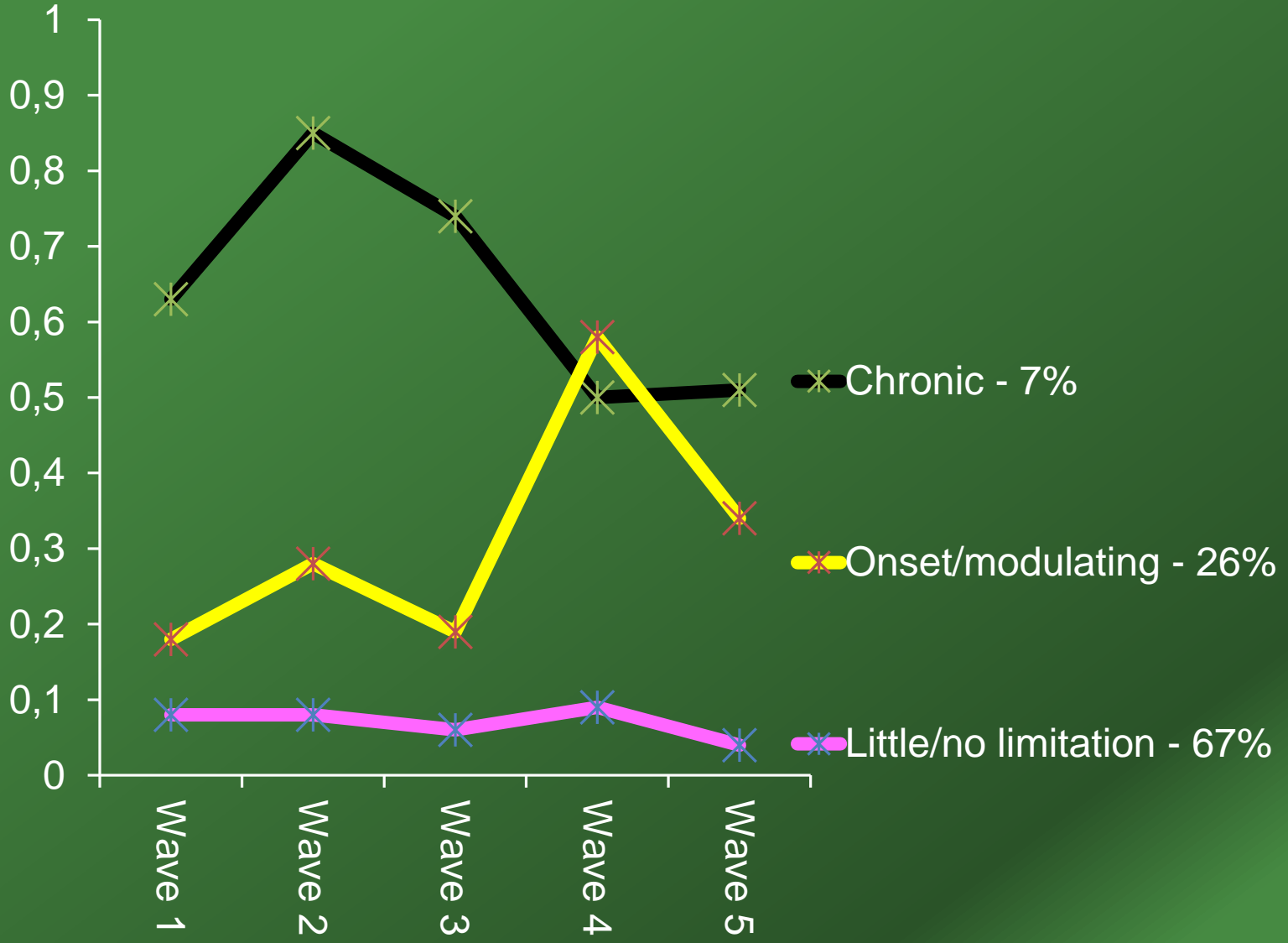
Determinants of class membership in four domains and when they are measured

A. Demographic	
1. Birth cohort	Baseline
2. Marital status	Wave 5
3. Nuclear household	Baseline
4. Household size	Baseline

B. Childbirth	
1. Total live births	Wave 5
2. Successful birth ratio	Wave 5
3. Age at first birth	Baseline

C. Socioeconomic status	
1. Education	Wave 1
2. Household wealth	Baseline
3. Urbanicity score	Baseline

D. Health	
1. BMI	Wave 1
2. Chronic conditions	Wave 1
3. Self-assessed health	Wave 1

What significantly predicts more favorable patterns?

In a multilevel multinomial regression with country level random effect, using Gllamm Stata version 13.0 (Rabe-Hesketh & Skrondal, 2008)

Predictor	Direction of effect
Later birth cohort	**+ve**
Nuclear household at baseline	**+ve**
Smaller household size at baseline	**+ve**
Greater number of live births	**+ve**
Higher age at birth of first child	**+ve**
Higher education	**+ve**
Greater baseline wealth	**-ve**
Greater urbanicity at baseline	**-ve**
Higher Wave 1 BMI	**-ve**
Chronic condition at Wave 1	**-ve**

+ve = positive association

-ve = negative association

Conclusion

- Recognizing patterns of functional problems and their determinants has implications for understanding the global burden of disability.

a) Prevalence of functional limitation appears to be fairly high

b) All patterns over time show up in the data

c) These can be classified into three underlying classes

d) A series of determinants predict membership in these classes

Thank you
Danke
Salamat