Functional disability and diabetes among Latin American and Caribbean elders

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Demographic context

Life expectancy at birth in Latin America has increased from 52 years to near 72 years in the last fifty years and further increases are expected in the next decades (CELADE 2004);

Percentage of those aged 65 and over is expected to rise from the current 5.5% to 10% in 2025 (CELADE 2004).

Do increases in life expectancy imply better health for this larger surviving aging population?

What is the impact of diabetes on the health of the elderly population in the Latin America and the Caribbean?

Context: epidemiological and nutritional transitions are in progress

In the last decades, a considerable part of Latin American and Caribbean population has changed diet and lifestyles (mainly through lack of exercise) and those changes have influenced the prevalence of diabetes.

Diabetes prevalence is on rise - in 1995, the prevalence rate was estimated to be 5.7% and it is expected to reach 8.1% in 2025 – a 42% increase (King et al. 1998).

There is some evidence that obesity is also on the rise in Latin America and the Caribbean.

Diabetes: very brief overview

Diabetes is a metabolic disease characterized by high blood sugar levels.

Diabetes results from defects in insulin secretion, or action, or both.

Diabetes mellitus is generally recognized to be a result of genetic susceptibility and environmental factors.

Type 1 diabetes: the body failures to produce insulin;

Type 2: results from insulin resistance combined with relative insulin deficiency.

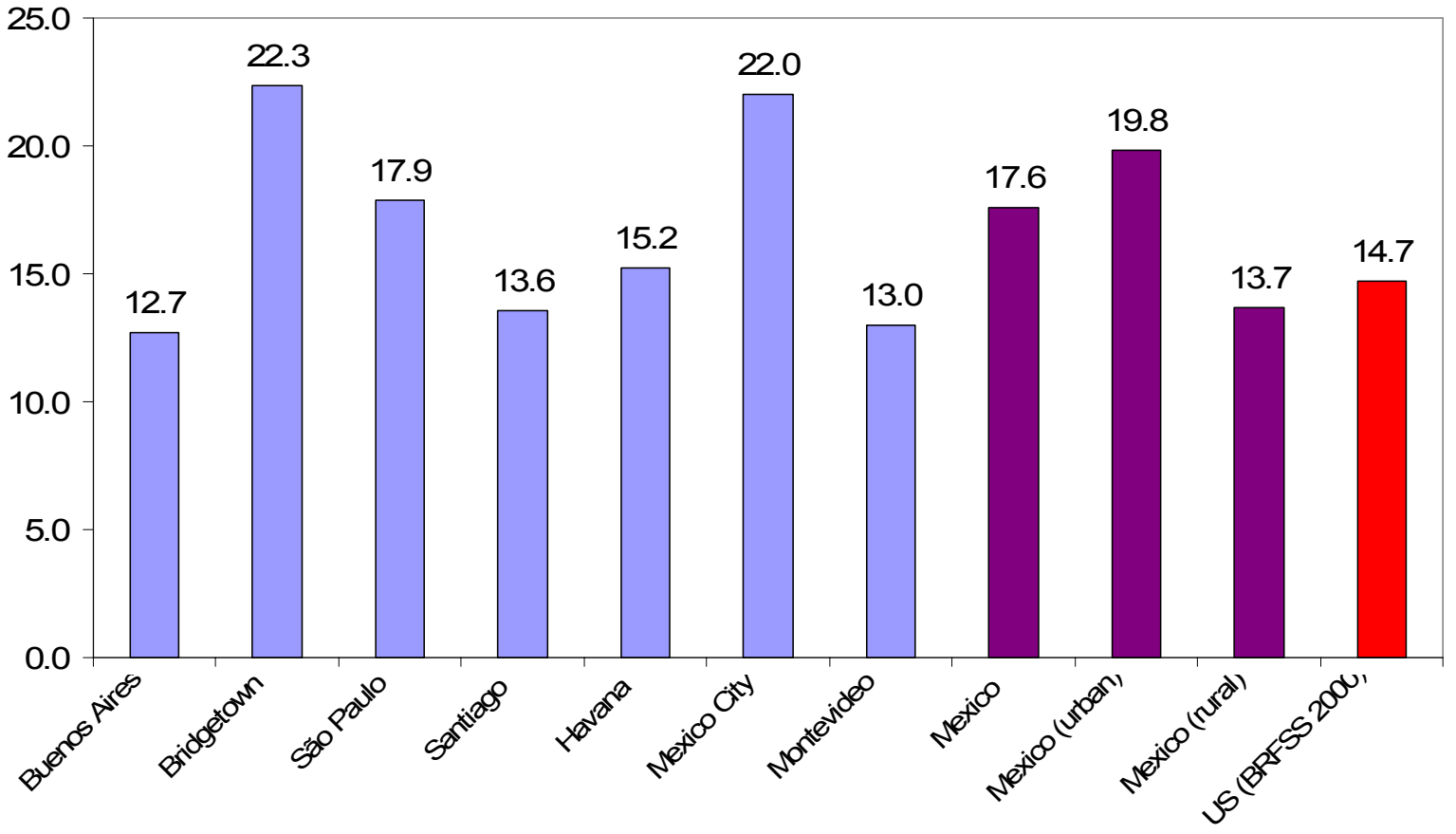
Pre-diabetes: higher levels of blood glucose, but not as high for the diagnosis of type 2 diabetes.

Diabetes prevalence among elders in Latin America and the Caribbean

Diabetes prevalence in Latin America and the Caribbean is relatively high.

Most of the cases are of type 2 diabetes (~90 to 95%).

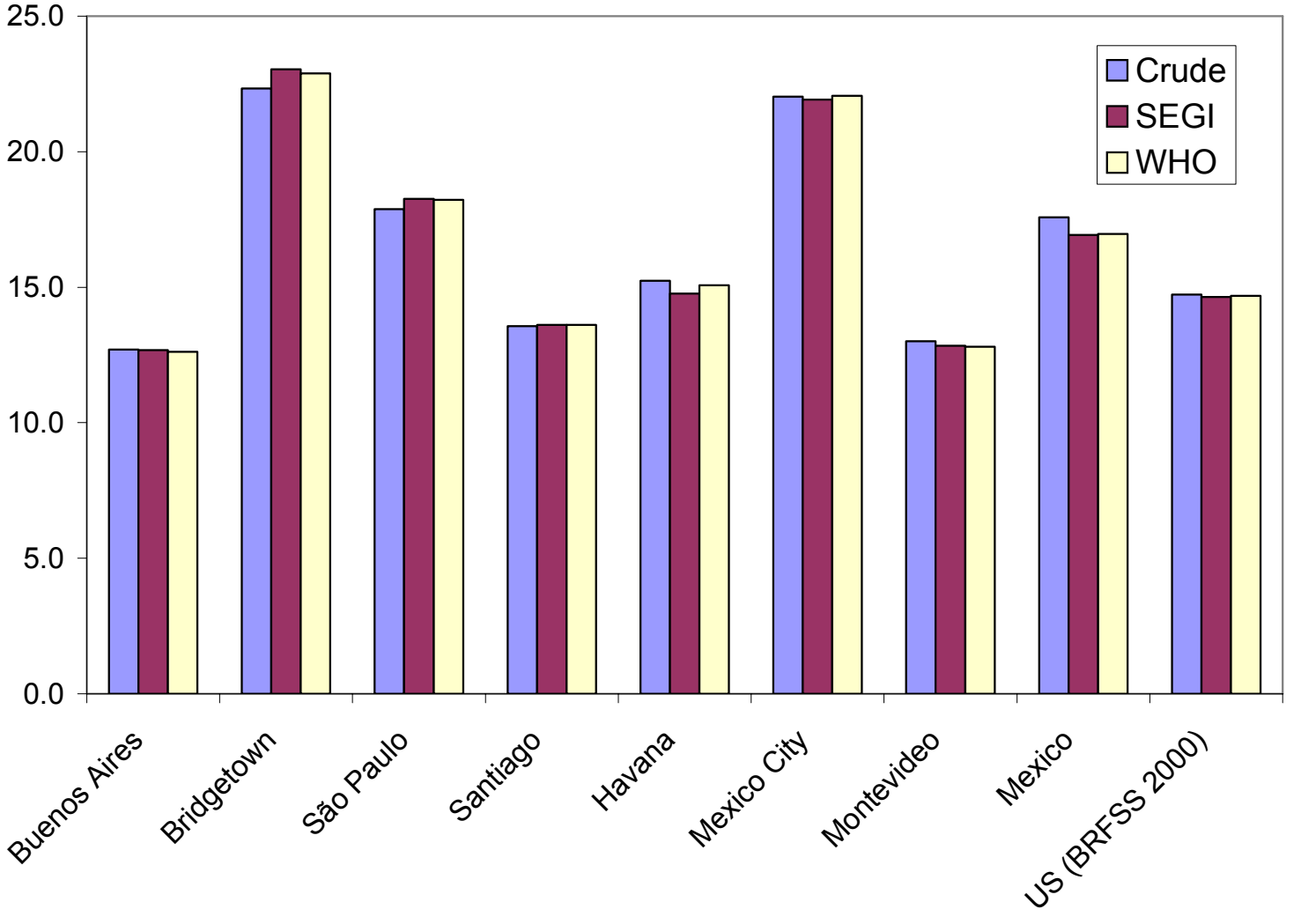
Prevalence of diagnosed diabetes among elders (60+) in Latin America and the Caribbean



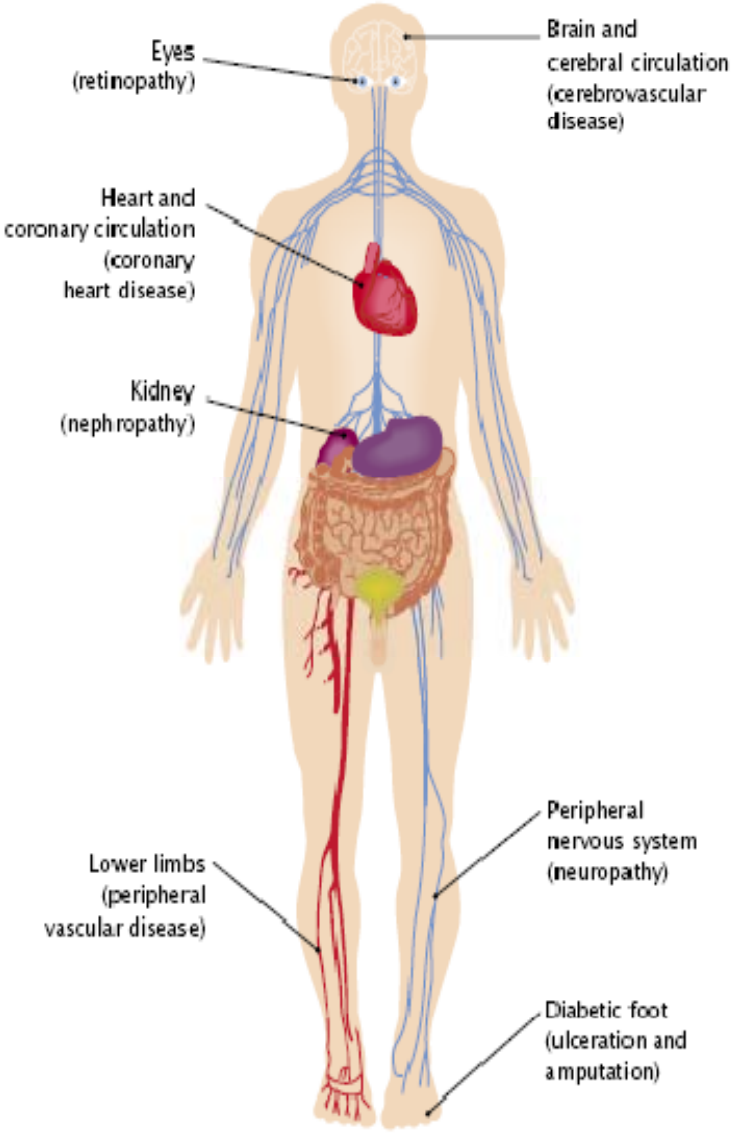
Note: Estimates are not age standardized.

US data from Mokdad et al 2001

Prevalence of diagnosed diabetes among elders (60+) in Latin America and the Caribbean – crude and age standardized rates



Diabetes and comorbidities



Usually, functional disability among diabetics is thought to be a consequence of these medical conditions (Gregg et al. 2000, Gregg et al. 2002, Volpato et al. 2002, Egede 2004, Maty et al. 2004).

From: Diabetes Atlas, 2003.

Diabetes and disability

Diabetes has been shown to be strongly associated with physical limitation and functional disability. In general, individuals with diabetes are about two to three times more likely to have disability than those without (Gregg et al. 2000, Valderrama-Gama et al. 2002, Bruce et al. 2003, Ryerson et al. 2003, Maty et al. 2004).

Diabetes and disability

Those with diabetes are also more likely to become functionally disabled (Gregg et al. 2002). Gregg et al. (2002) report a yearly incidence of 9.8% among women with diabetes and 4.8% among non-diabetics. After controlling for comorbidities and potential confounders, diabetes was still associated with an increase of 42% in the risk of any incident disability in elderly women (Gregg et al. 2002).

Hypotheses

The main hypothesis of this paper is that diabetes is likely to impose an important burden on those with the condition. More specifically, this paper aims to explore the following specific hypotheses:

The odds of functional disability are significantly higher in individuals with diabetes.

Individuals with diabetes at baseline are more likely to become functionally disabled.

Those with diabetes at baseline have worse outcomes (recovery and mortality).

Data

- **Salud, Bienestar y Envejecimiento en América Latina y el Caribe Proyecto (SABE)**
- **Mexican Health and Aging Study (MHAS)**

Data - SABE

SABE is a multicenter survey that investigates the health and well being of older people (aged 60 and over) and, in some cases, of their surviving spouse in seven capital/major cities in countries of Latin America and the Caribbean. The cities investigated were: Buenos Aires (Argentina); Bridgetown (Barbados); São Paulo (Brazil); Santiago (Chile); Havana (Cuba); Mexico City (Mexico); Montevideo (Uruguay).

The final sample is composed by 10,902 individuals aged 60 and over.

Data - MHAS

MHAS is a prospective two-wave panel study of a nationally representative cohort of Mexicans born prior to 1951 (50 and older). The survey has national and urban/rural representation. Surviving spouses regardless of their age were also interviewed. The baseline interview was conducted in 2001 and the second wave during 2003.

Data - MHAS

First wave: A total of 15,186 complete interviews were obtained (response rate reached 90.1%)

In the first wave, the final sample is composed by 13,055 individuals aged 50 and over with complete information on age, sex and diabetic status. There are 7,150 individuals aged 60 and over.

Mortality information was obtained in the next-of-kin questionnaires.

Disability measures

Activities of daily living (ADL): dressing, bathing, eating, getting in and out of the bed (transferring), and toileting.

Instrumental activities of daily living (IADL): preparing a hot meal, money management, shopping, and taking medication.

Nagi (Nagi, 1976) - physical performance measure: lifting or carrying objects weighted 5 Kg or over; lifting up a coin (using fingers to grasp or handle); pulling or pushing a large object such as a living room chair; stooping, kneeling or crouching; and, reaching or extending arms above shoulder level.

ADL, IADL and NAGI

ADL, IADL and Nagi scale were measured in 3 different ways:

Binary - scoring ‘0’ indicates no limitation and scoring ‘1’ indicates having difficulty performing at least one activity;

Binary with severity - scoring ‘0’ indicates having difficulty performing none or less than 3 activities, score ‘1’ indicates having difficulties performing 3 or more activities

Continuous scale - the conditions were summed creating a summary score ranging from ‘0’ to ‘6’ in the case of ADL scale, from ‘0’ to ‘4’ in the IADL score, and from ‘0’ to ‘5’ for the Nagi scale. In each scale the score ‘0’ represents the ability to independently perform all activities.

Health conditions – self reported

Heart disease

Stroke

Arthritis

Lung disease

Cancer (only in pooled models)

Models and methods

Model 1: age, sex and diabetes status

Model 2: model 1 + obesity

Model 3: model 1+ chronic conditions

Model 4: model 2+ chronic conditions

Model 4a: do not include cancer

Logistic regressions – binary outcomes

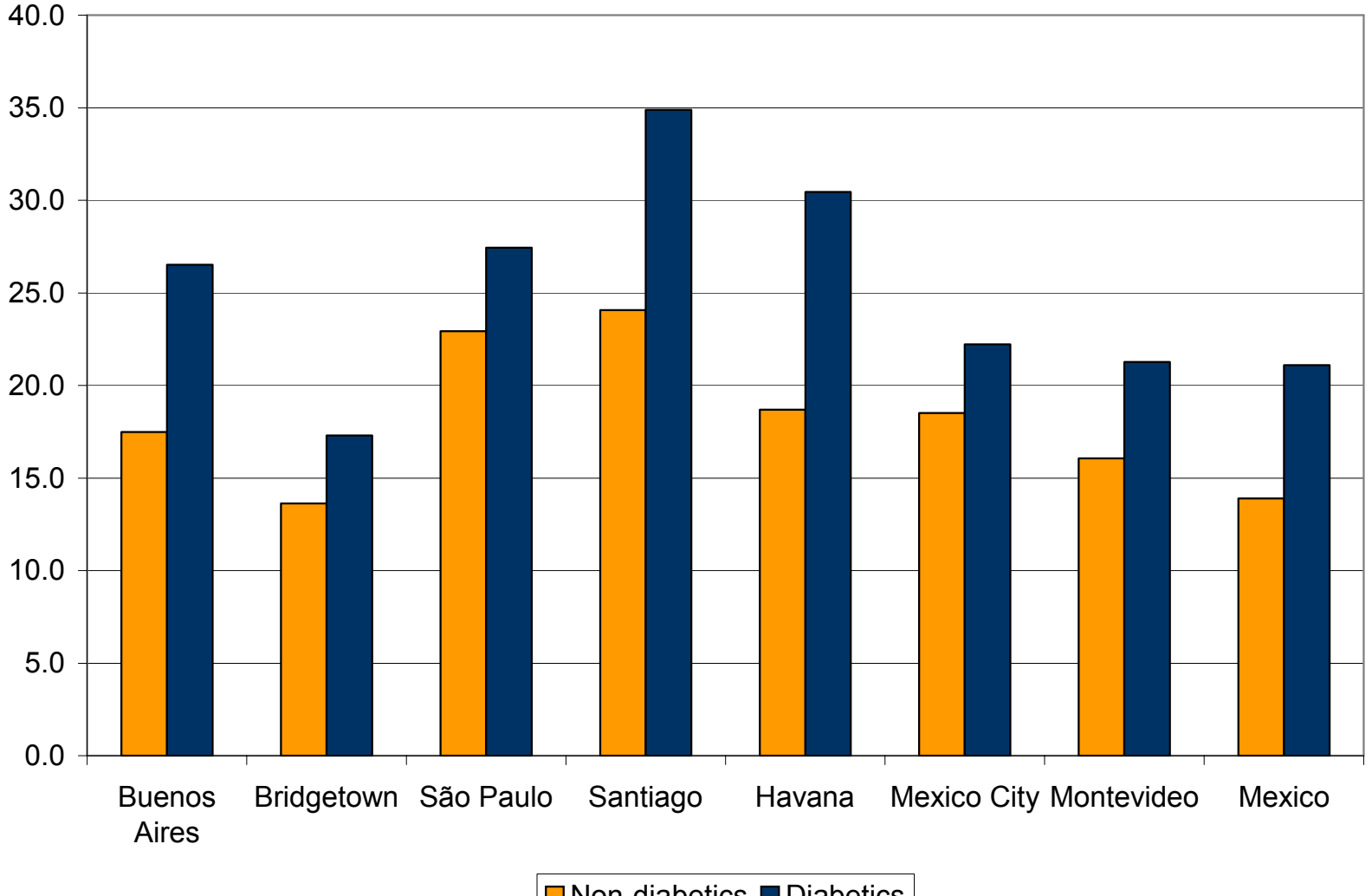
Generalized logistic regression for ordinal dependent variables – number of conditions

Descriptive data

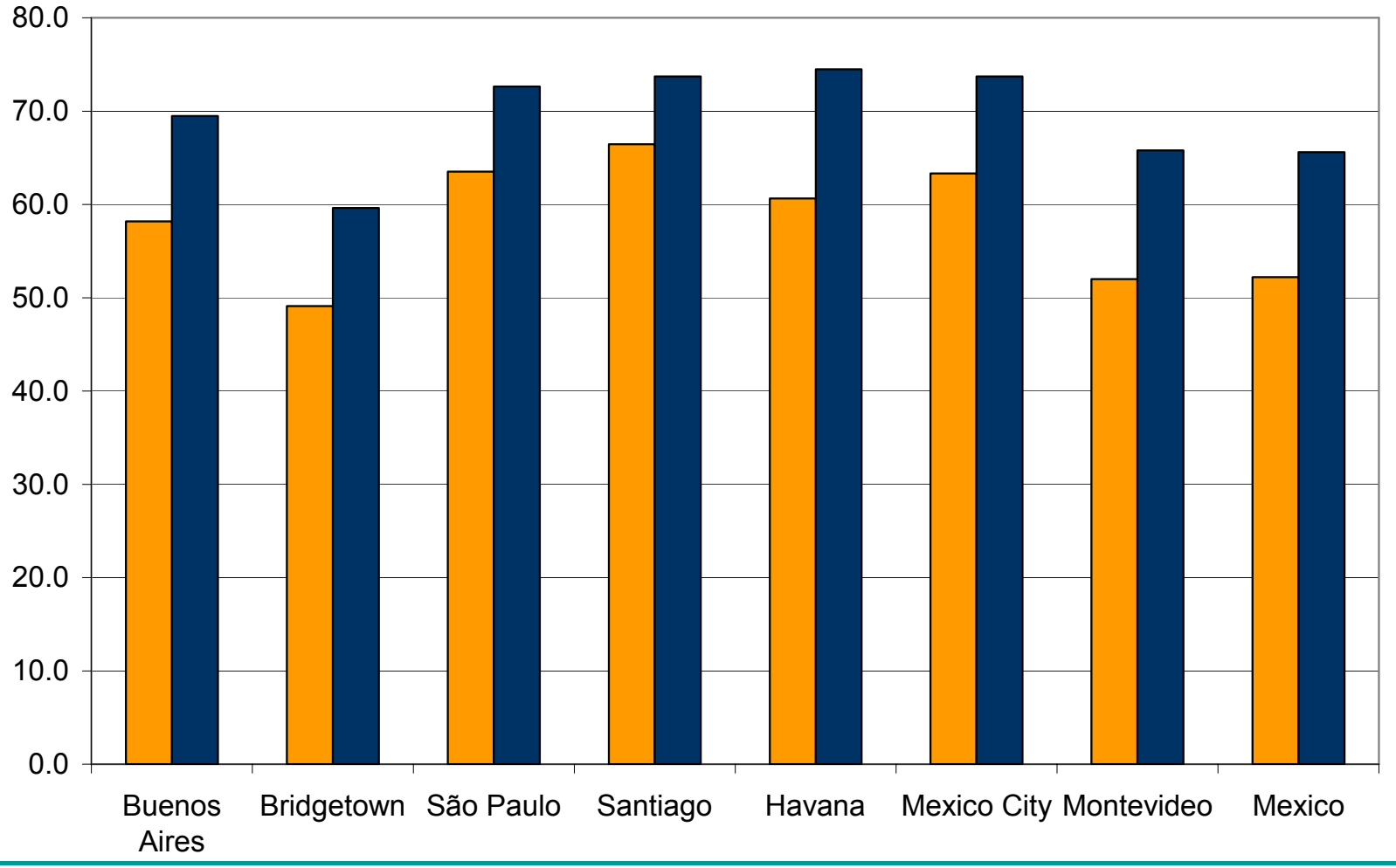
Variables	SABE			MHAS 2001		
Percentages and means	Non-diabetics	Diabetics	p-value	Non-diabetics	Diabetics	p-value
Age (mean)	71.8	71.6	0.221	69.6	68.9	0.002
Female	61.0	66.5	0.000	52.4	60.3	0.000
ADL	19.0	25.3	0.000	13.9	21.1	0.000
IADL	15.2	22.5	0.000	11.4	17.7	0.000
Nagi	59.2	69.9	0.000	52.2	65.6	0.000
Severe ADL	6.2	8.9	0.000	4.5	8.9	0.000
Severe IADL	4.0	6.6	0.000	3.1	5.6	0.000
Severe Nagi	20.5	29.8	0.000	21.3	31.0	0.000
BMI (mean) *	26.6	27.7	0.000	26.8	27.9	0.003
Obesity	23.8	28.4	0.000	22.0	28.5	0.053
Cancer	3.9	3.8	0.855	1.9	2.3	0.311
Heart disease	19.8	26.4	0.000	3.9	7.8	0.000
Stroke	6.2	9.3	0.000	3.5	5.3	0.003
Arthritis	42.0	45.0	0.017	24.7	27.2	0.074

Note: * BMI in SABE does not include Argentina. Only 20% of the MHAS sample has anthropometric measures.

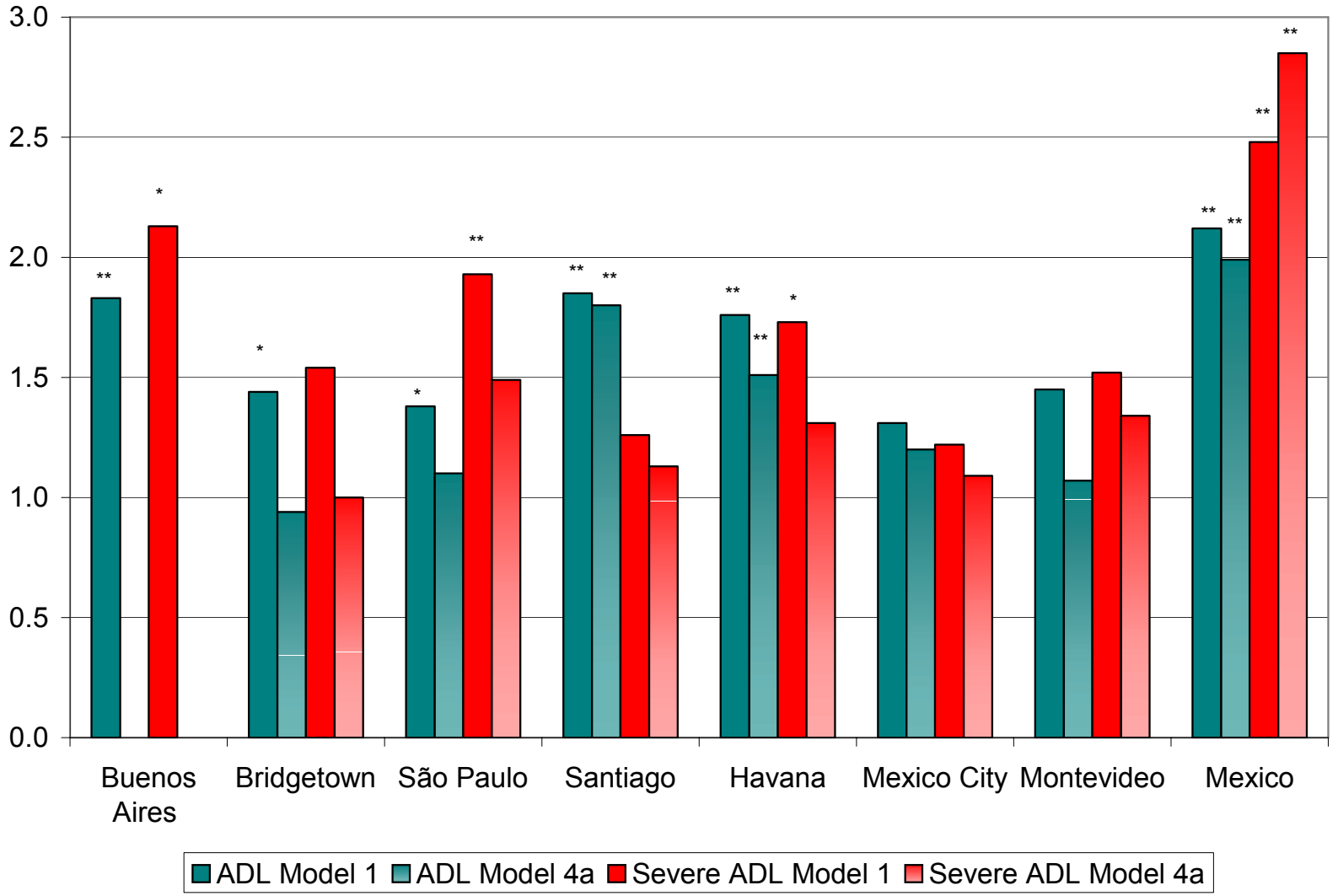
Prevalence of ADL among elderly people (60+) in Latin America and the Caribbean by diabetic status, SABE and MHAS



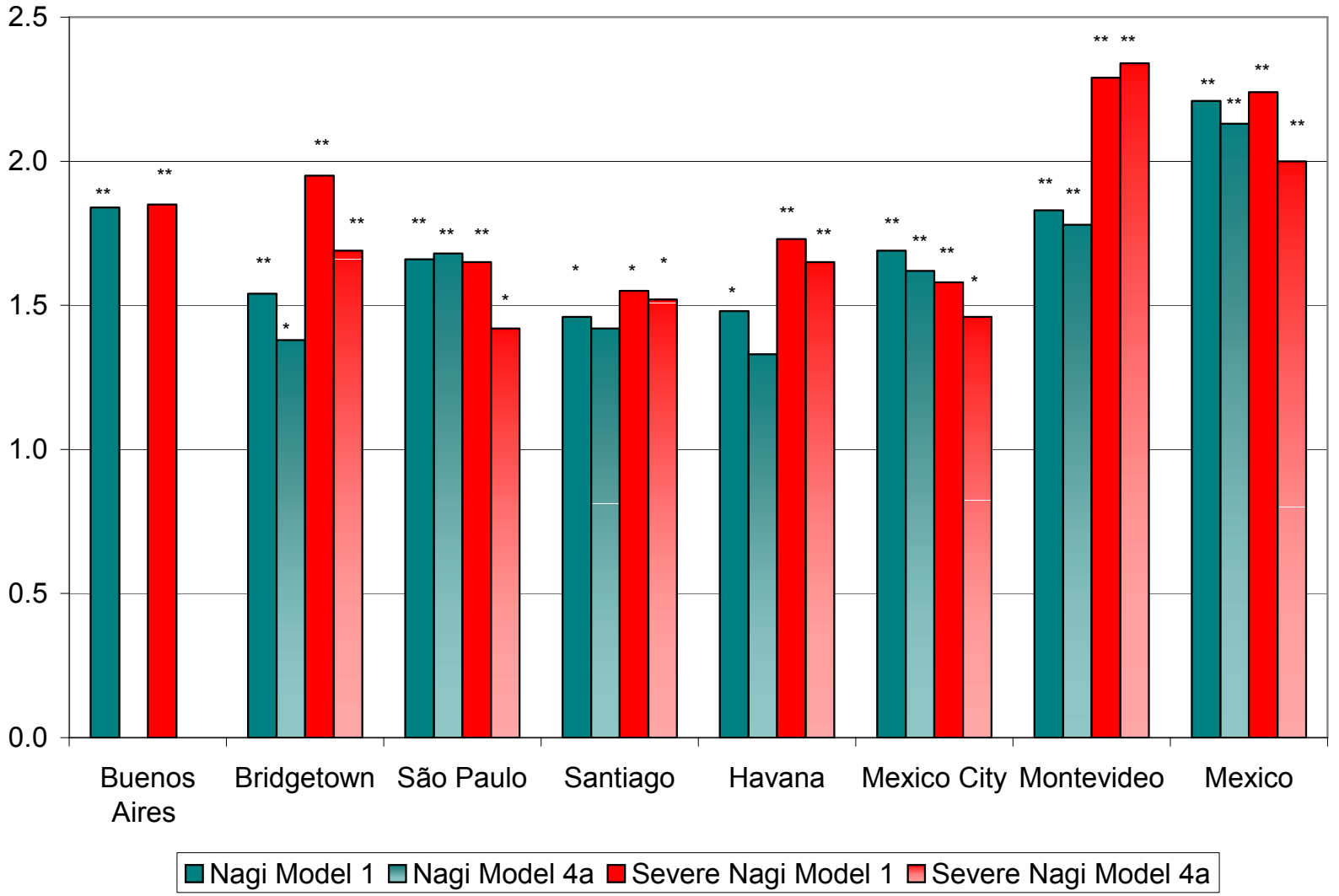
Prevalence of Nagi limitations among elderly people (60+) by diabetic status, SABE and MHAS



Odds of having ADL limitations are higher among individuals with diabetes



Odds of having Nagi limitations is higher among diabetics



Odds of having increasing numbers of Nagi limitations

The odds of functional disability are significantly higher in individuals with diabetes

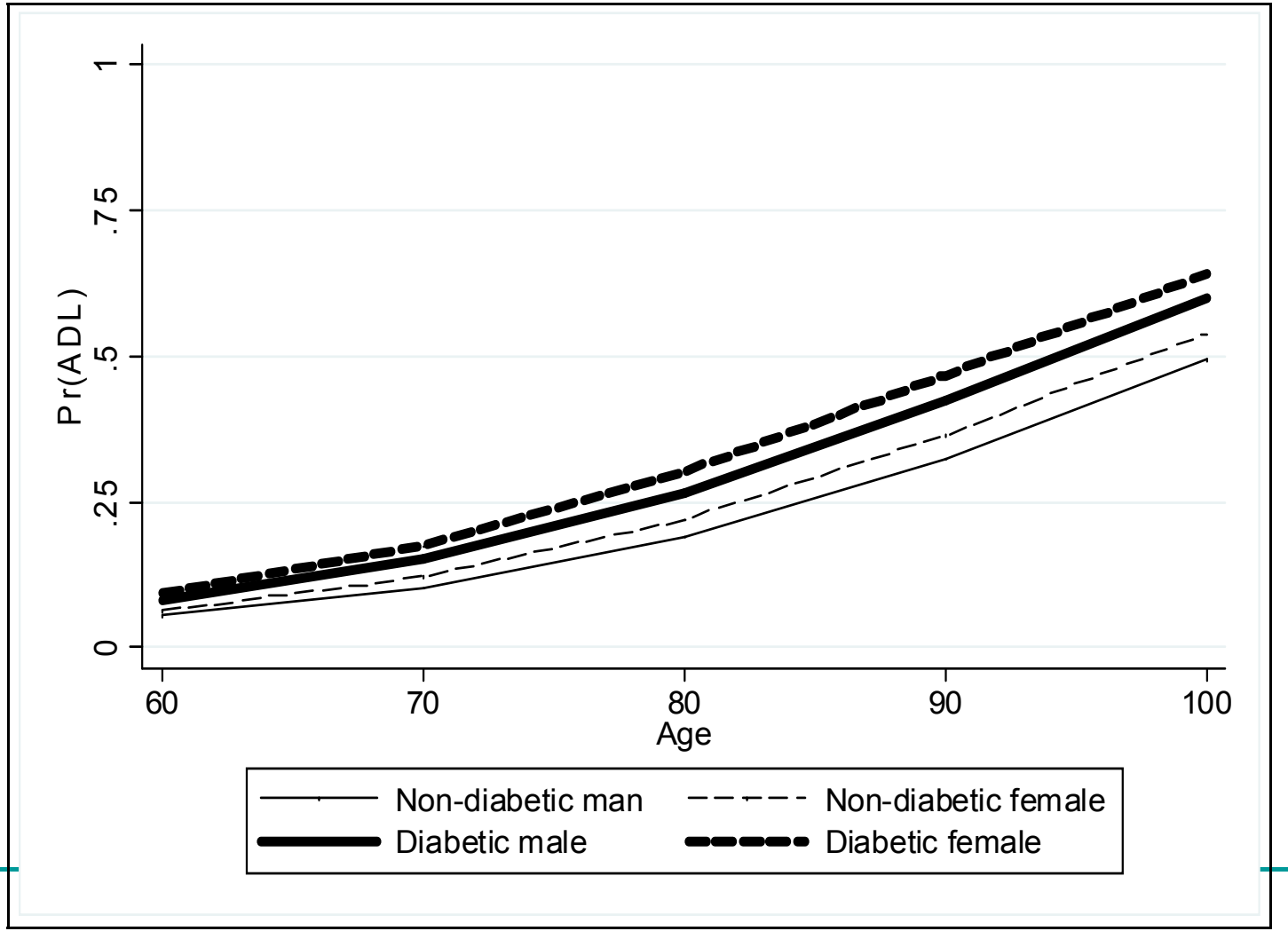
Data from SABE and MHAS show that diabetes is associated with higher prevalence of ADL, IADL and Nagi limitations. It is also associated with more severe limitation.

Individuals with diabetes are about 1.6 (Havana) to 1.9 times more likely to have ADL than those without (Model 1).

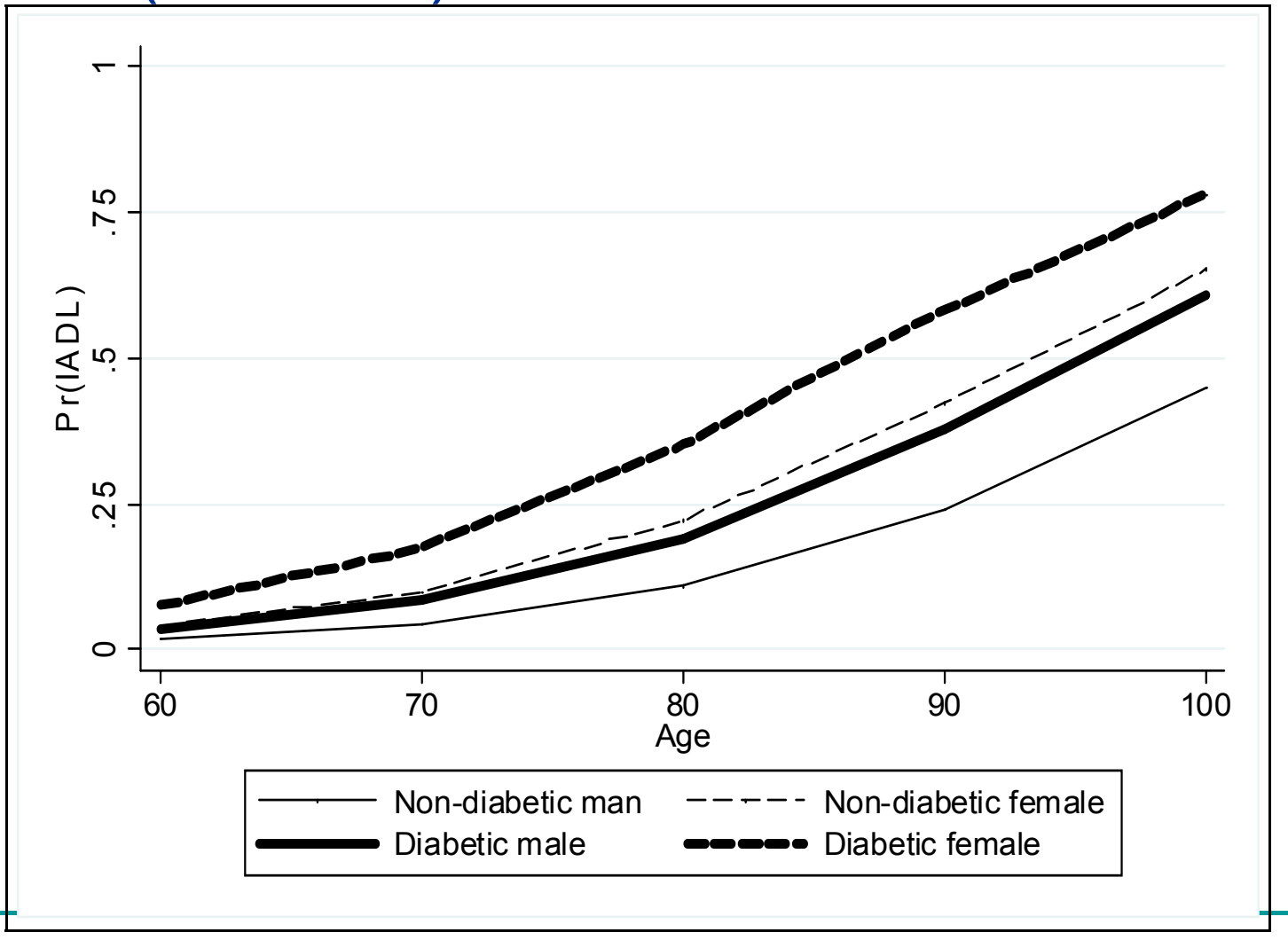
Diabetics are 1.6 (São Paulo) to 4.7 times more likely to have severe IADL than non-diabetics (Model 1).

Chances of having severe Nagi limitations are 1.5 (Santiago and Havana) to 2 times higher among diabetics (Model 4).

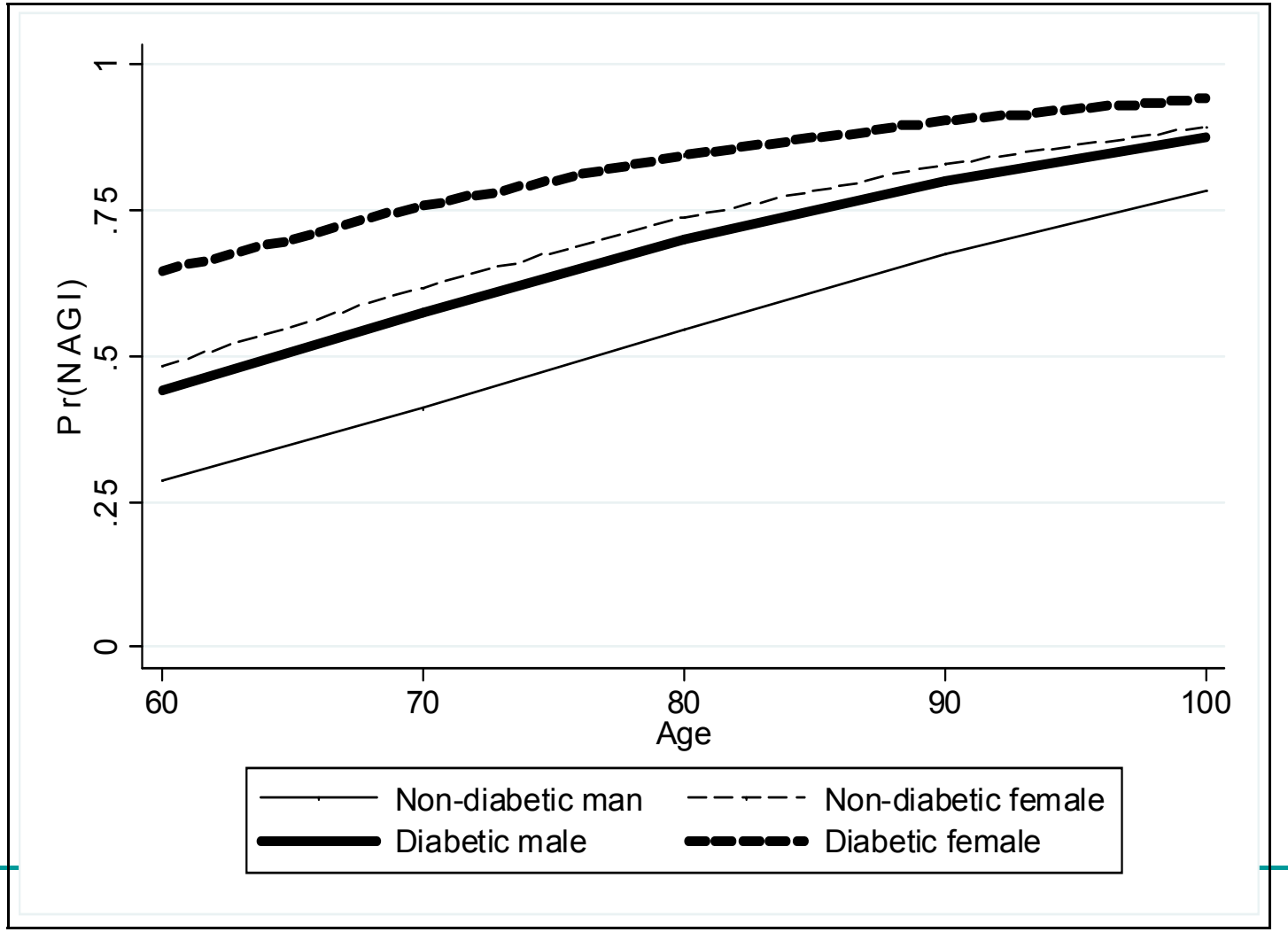
Predicted probabilities of having ADL, MHAS (Model 4)



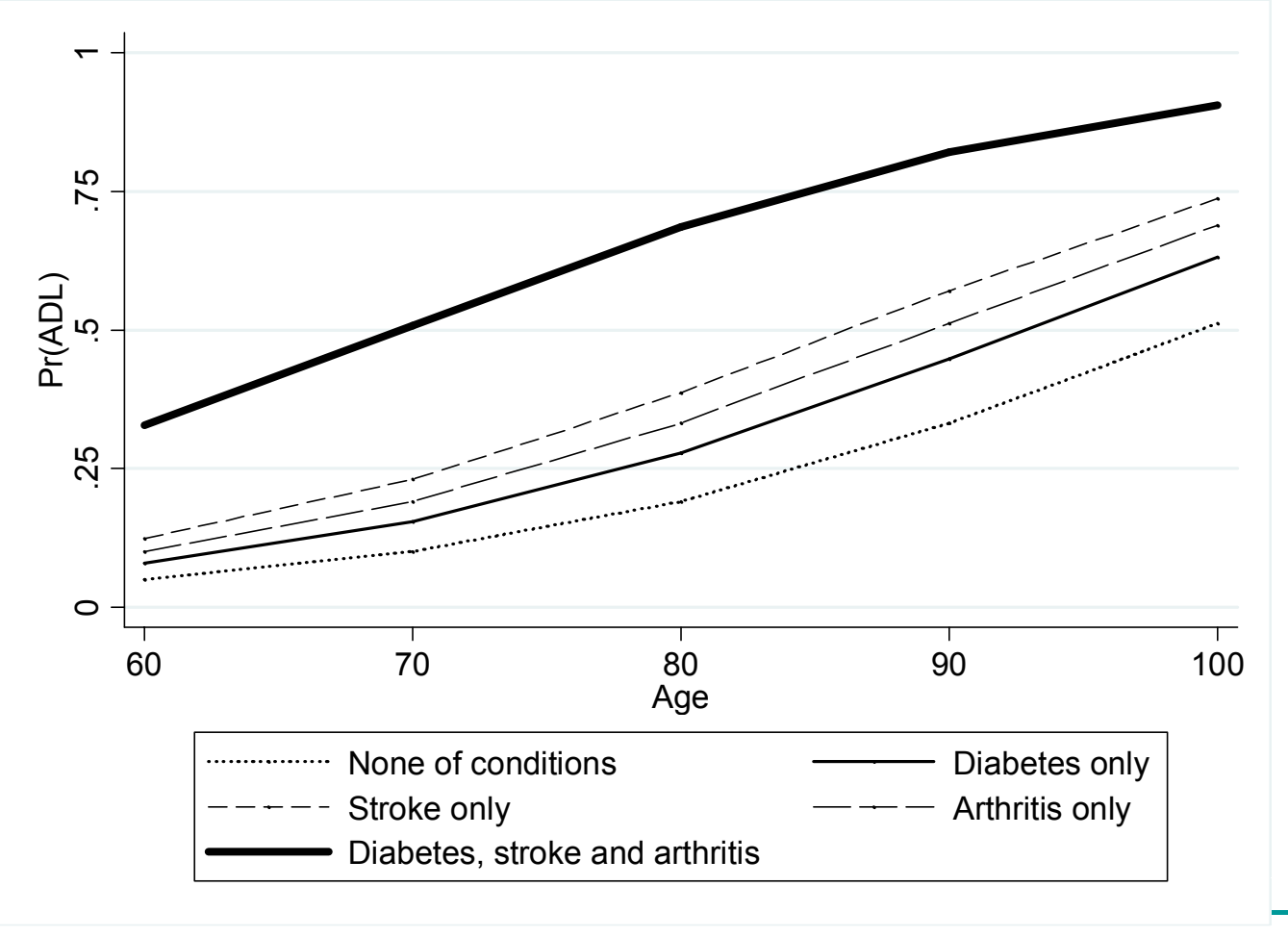
Predicted probabilities of having IADL, MHAS (Model 4)



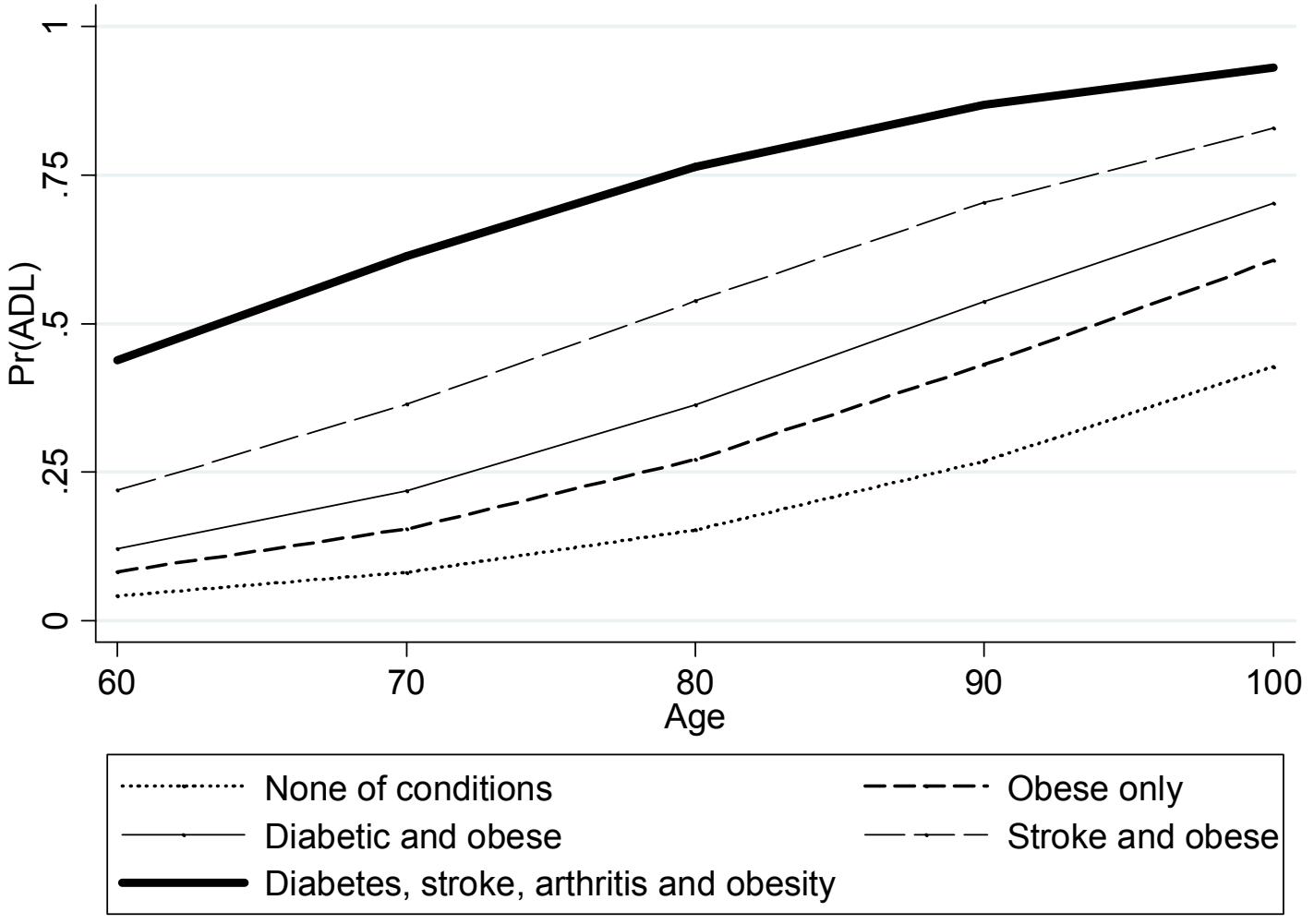
Predicted probabilities of having Nagi limitations, MHAS



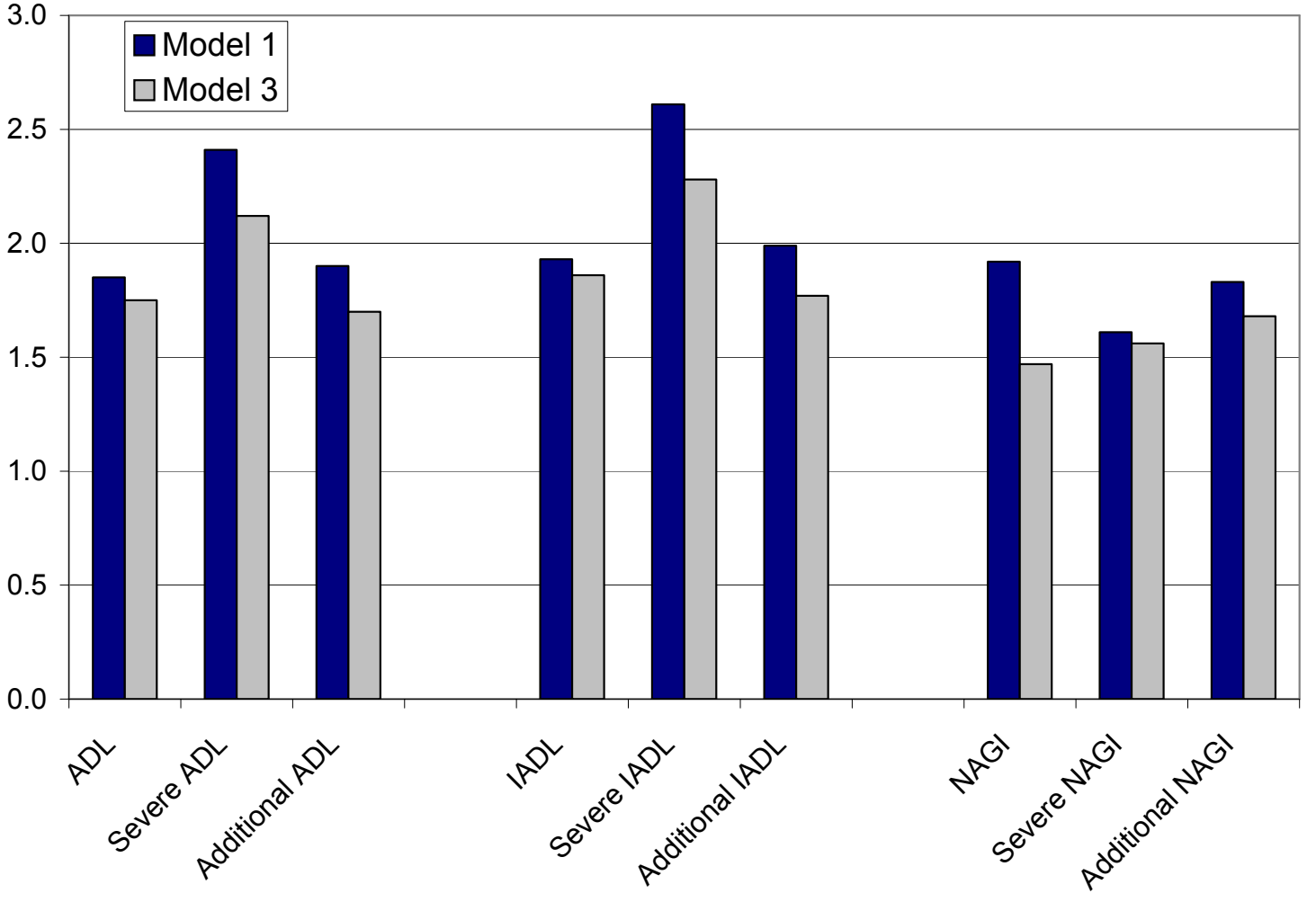
Prevalence of ADL by age given medical conditions, Mexico (Model 3)



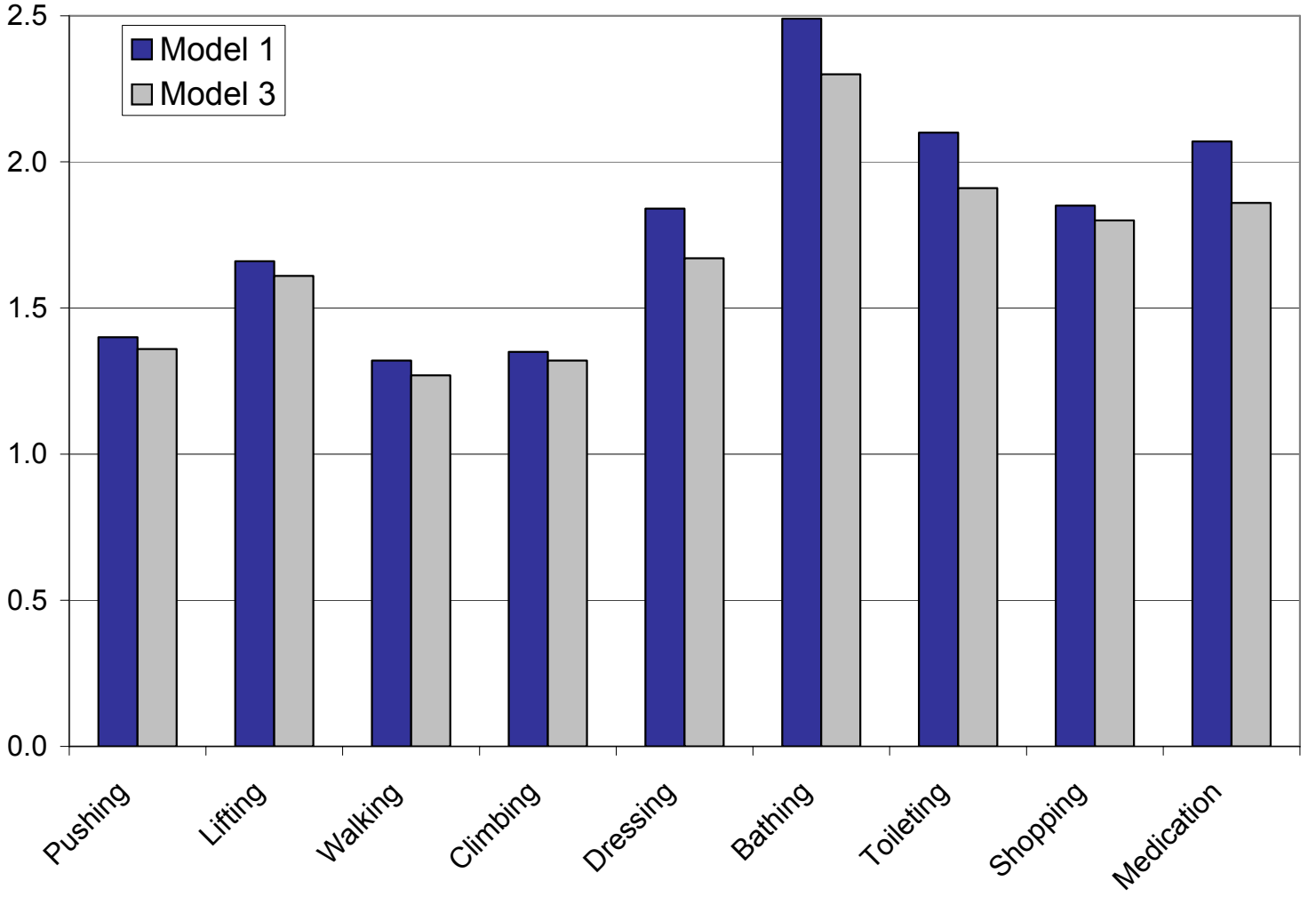
Prevalence of ADL by age given medical conditions, Mexico (Model 4)



Individuals with diabetes at baseline are more likely to develop functional and physical limitations – Mexico (all statistically significant)



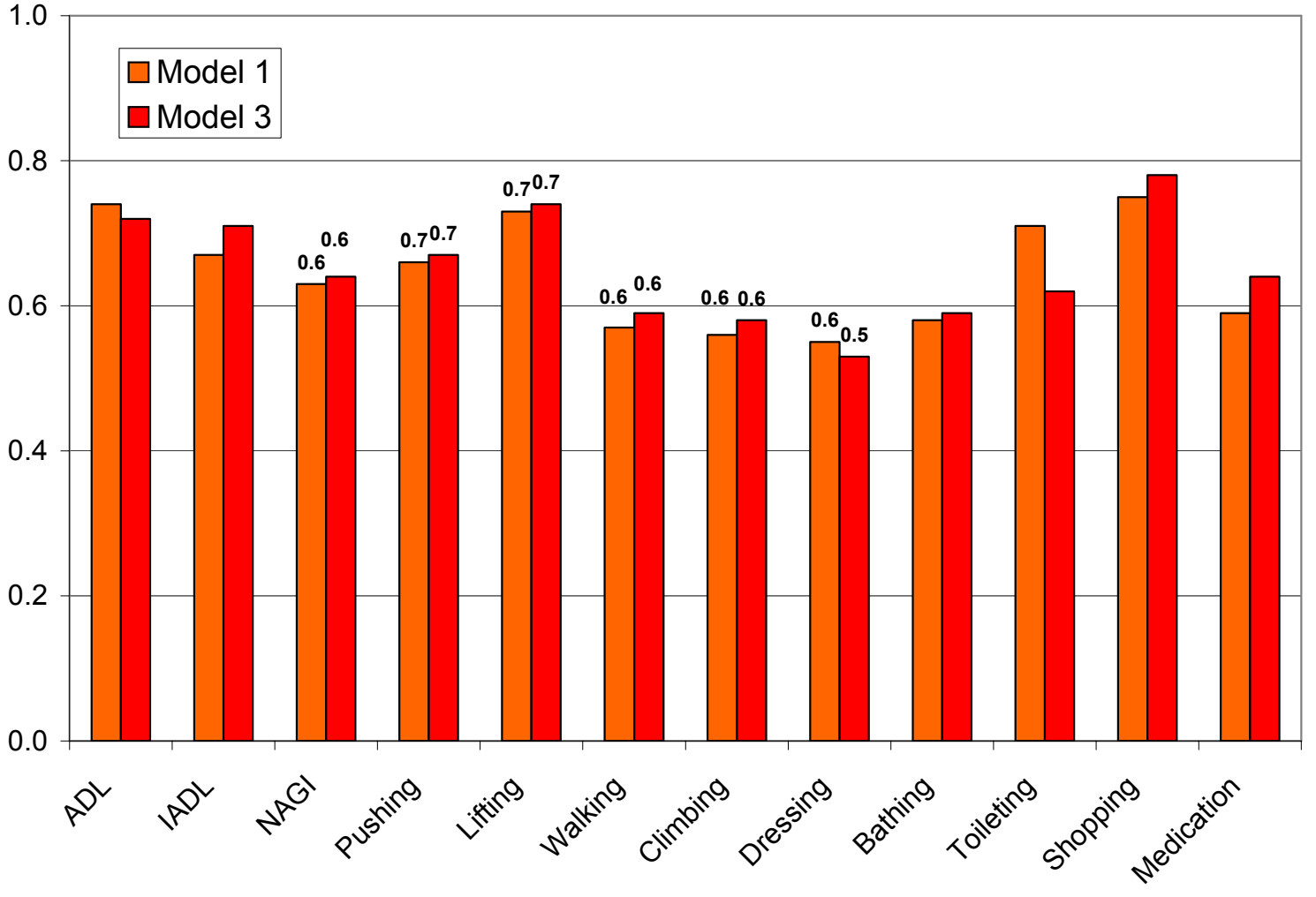
Individuals with diabetes at baseline are more likely to develop functional and physical limitations – Mexico (all statistically significant)



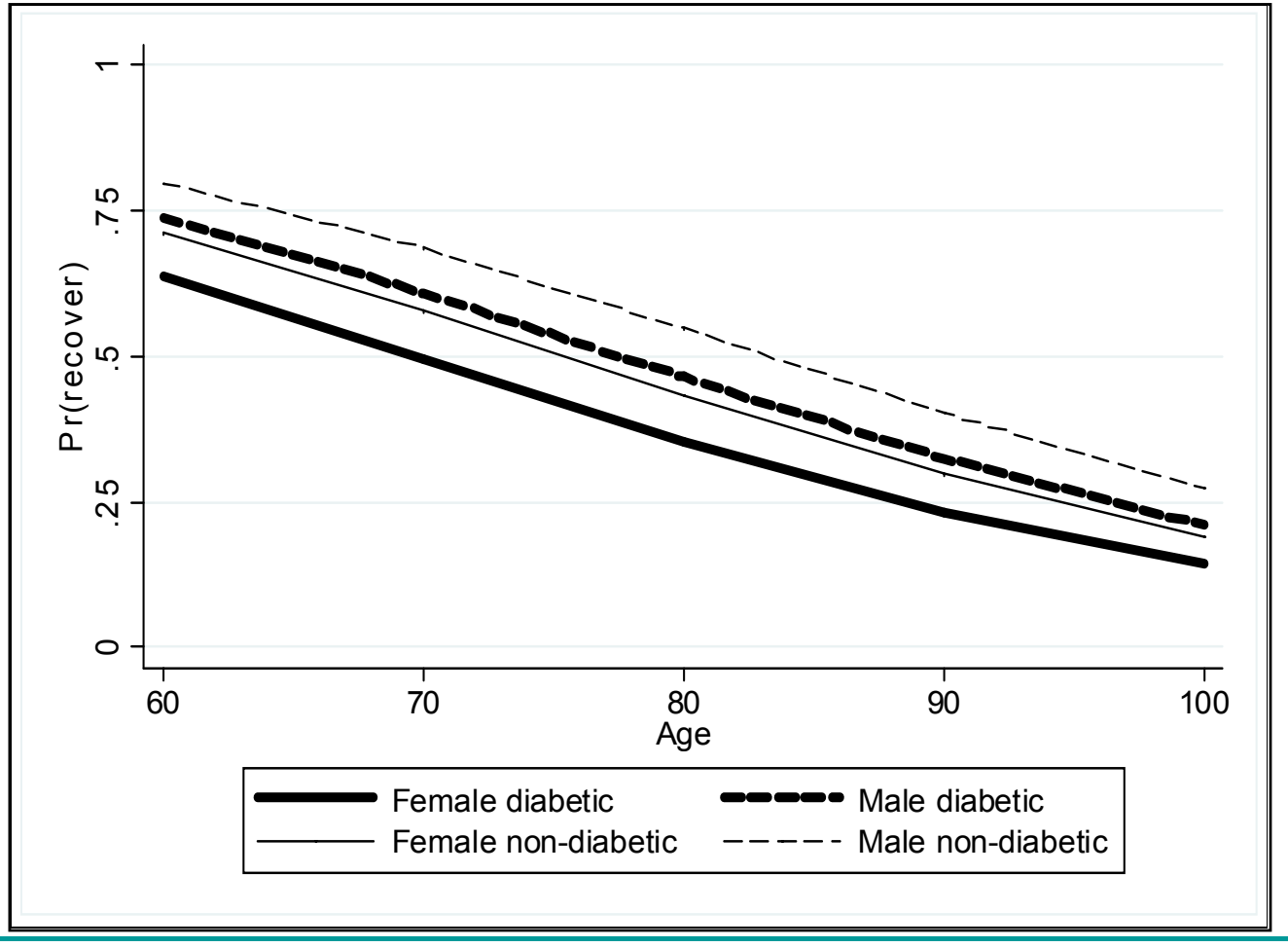
Individuals with diabetes at baseline are more likely to become functionally and physically disabled

- The risk of developing ADL and IADL is 1.5 to 2.0 as higher for those with diabetes than nondiabetics;
- Having diabetes at the baseline more than doubles the risk of developing difficulties bathing and toileting.
- Those with diabetes are also more likely to become unable to dress, shop and take medications by themselves.

Those with diabetes at baseline are less likely to recover from disability - Mexico



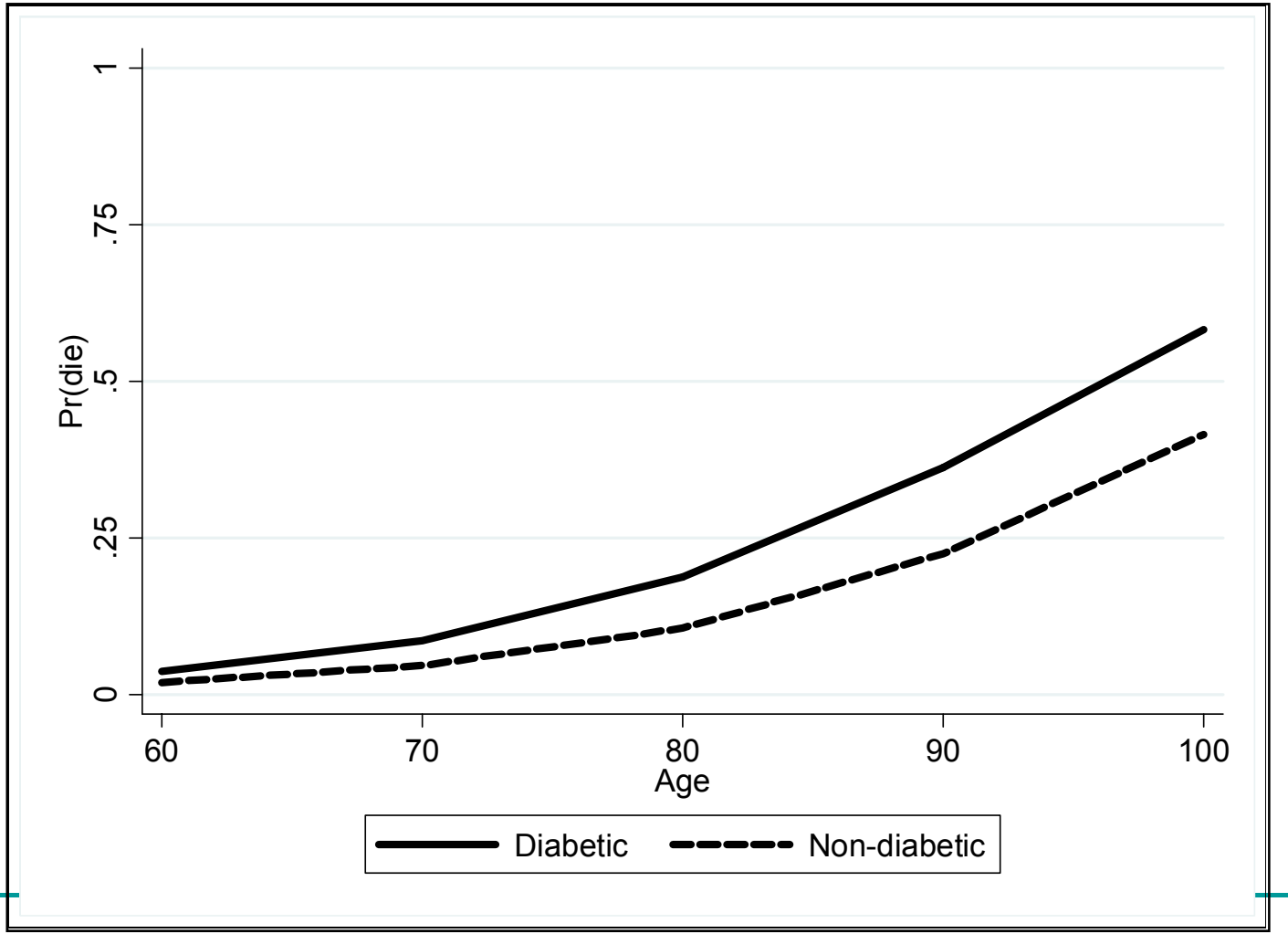
Predicted IADL recovery by age and sex, MHAS



Those with diabetes at baseline are less likely to recover from disability

Data from Mexico confirms that individuals with diabetes at the baseline are less likely to recover from NAGI limitations and activities such as pushing, lifting, walking, climbing and dressing.

Those with diabetes have higher mortality risks those without the disease



Final remarks

Diabetes is associated with a major burden of disability among elderly individuals in Latin America and the Caribbean.

Individuals with diabetes are about 1.5 to 2.5 times more likely to have disability than those without;

The risk of developing ADL and IADL is about 1.5 to 2.5 as higher for those with diabetes than nondiabetics;

The risk of becoming physically limited (NAGI) is higher for those with diabetes;

Recovery from functional and physical disability is considerably lower for those with diabetes.

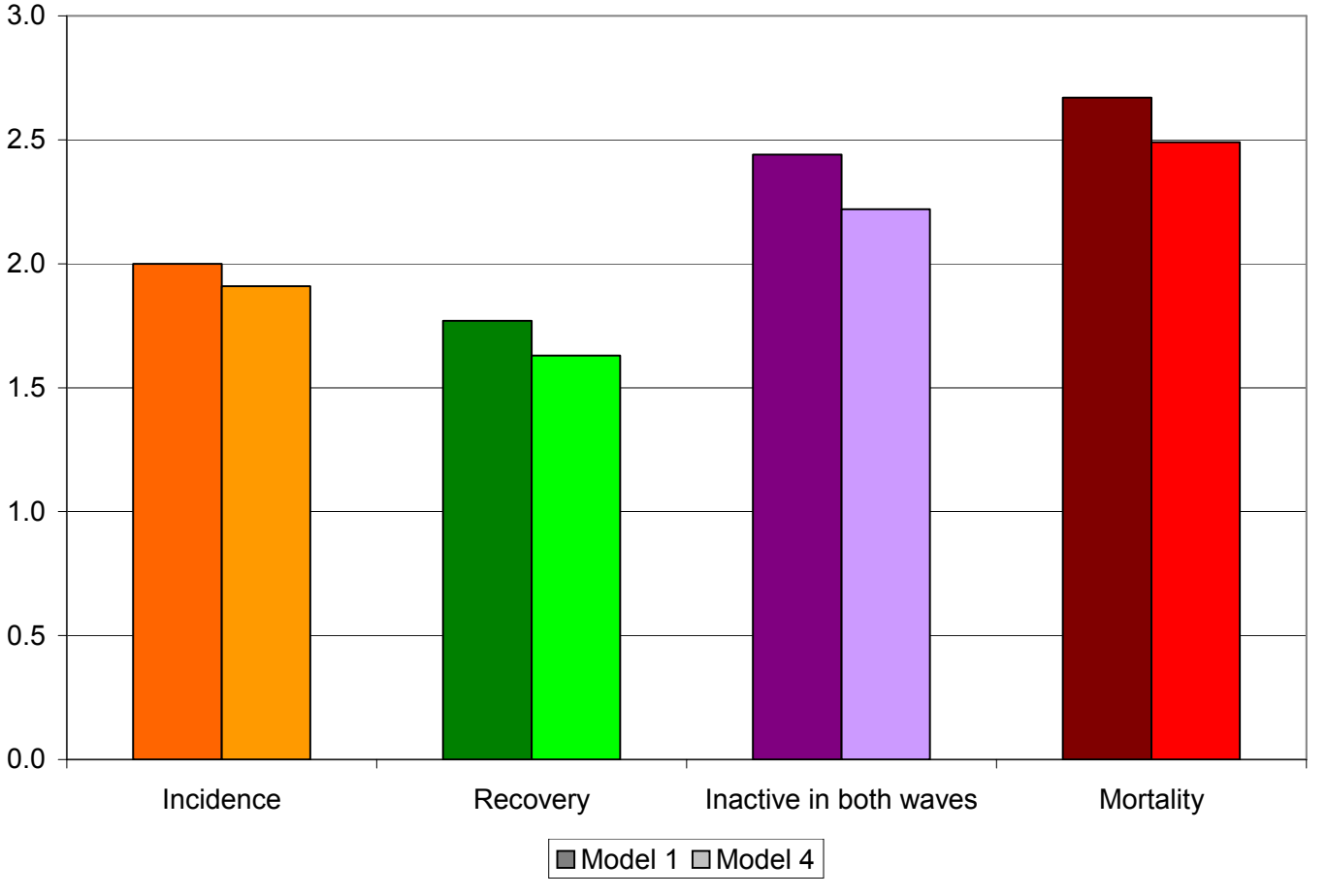
Final remarks

Individuals with diabetes are about 2 times more likely to die in a two year period than those without diabetes.

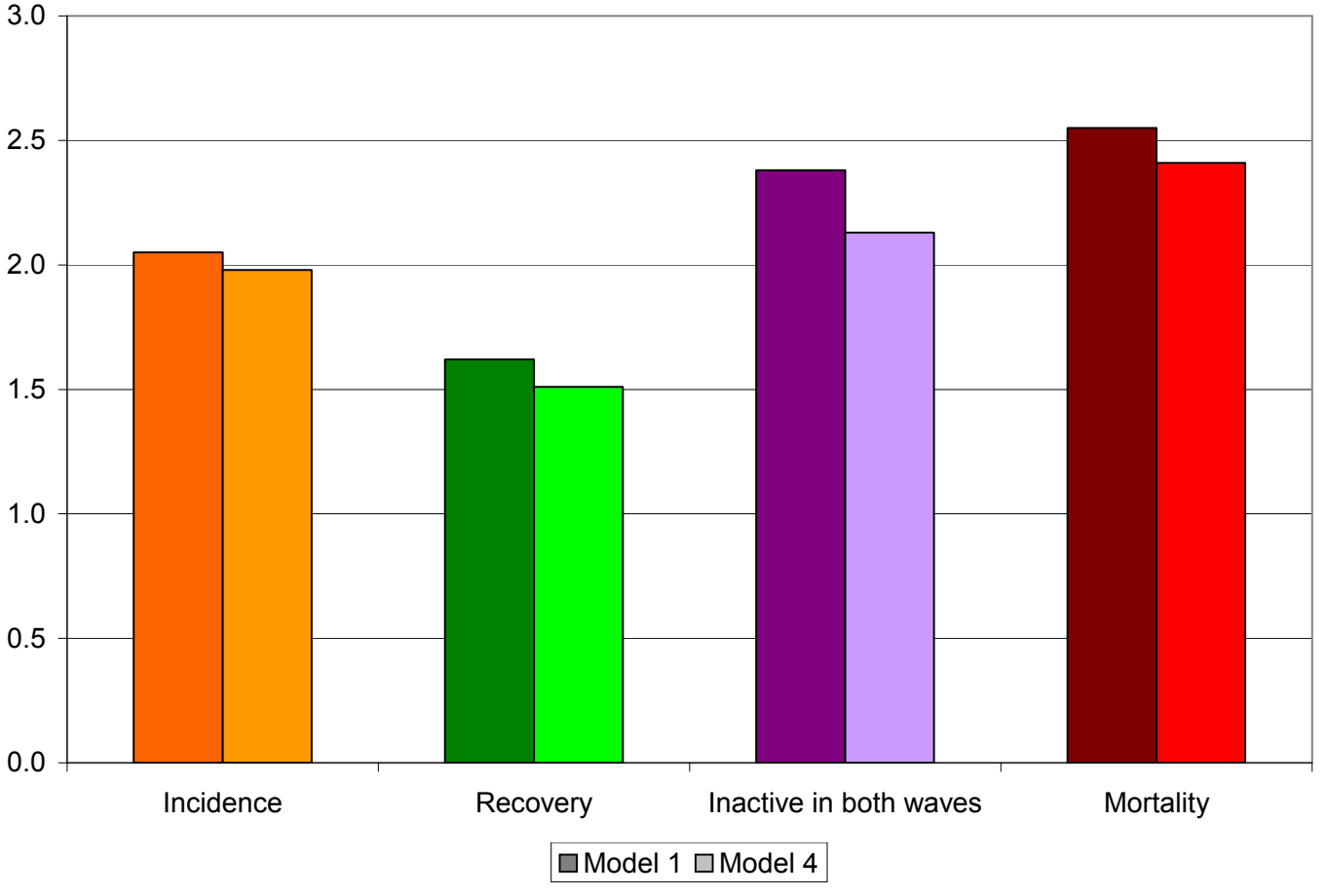
Prevalence data from SABE indicate that a large proportion of the remaining lives of those aged 60 are expected to be lived with diabetes. However, there are important differences across settings.

Thank you

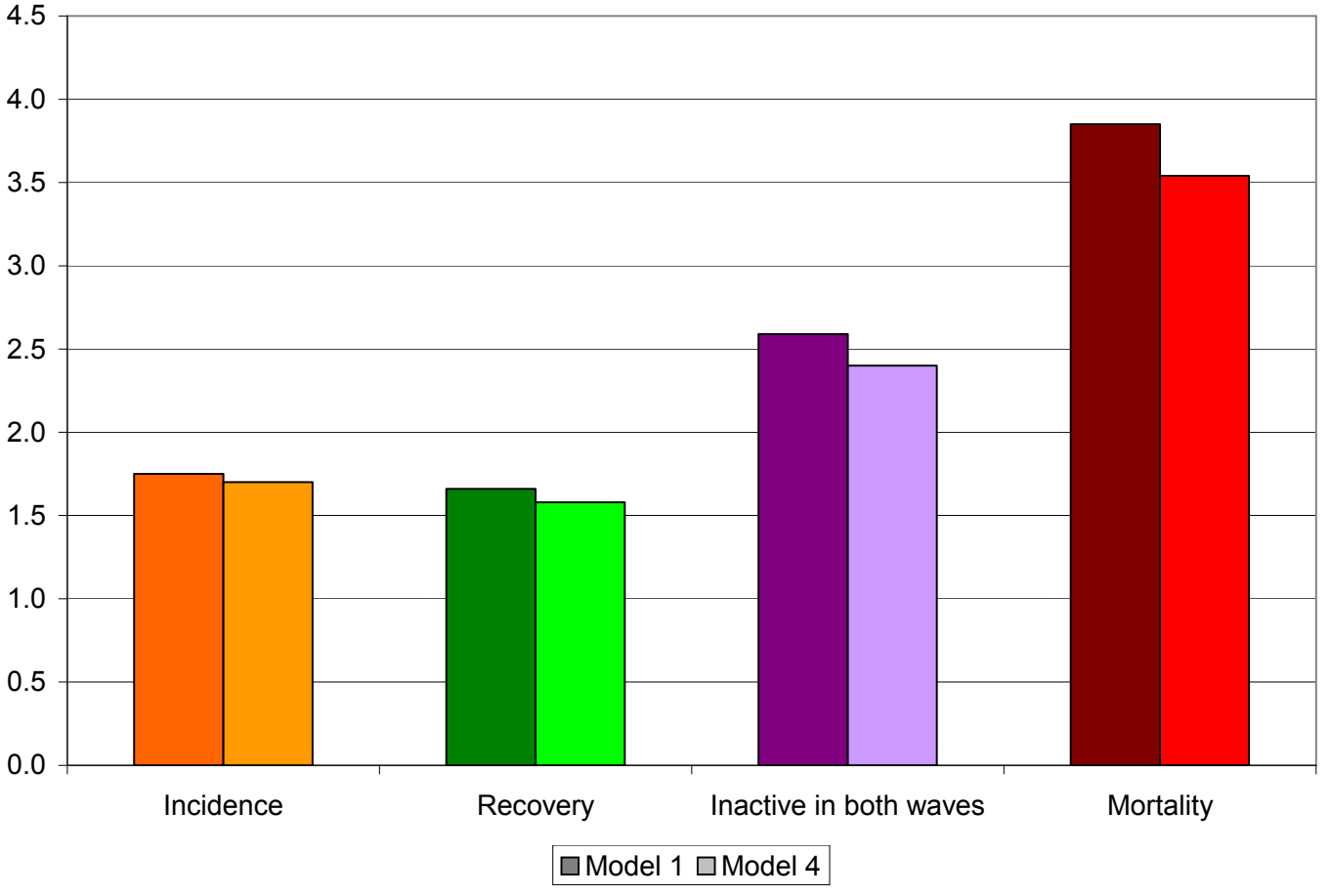
Multinomial regression (baseline active in both waves) – ADL, Mexico



Multinomial regression (baseline active in both waves) – IADL, Mexico



Multinomial regression (baseline active in both waves) – Nagi, Mexico



ADL measures

SABE: “Here are a few everyday activities. Please tell me if you have any difficulty with these because OF A HEALTH PROBLEM. Exclude any difficulties you expect to last less than three months.”

ADL: Do you have difficulty with…?

ADL: Yes, no, does not know, NR.

ADL measures

MHAS: Only for those with NAGI, except dressing

MHAS: "**Please tell me if you have any difficulty with each of the activities I mention. If you do not do any of the following activities, simply tell me. Do not include difficulties that you believe will last less than three months.**"

Because of a health problem, do you have any difficulty...?

Yes, no, can't do, doesn't do, DK, RF.

IADL measures

SABE: “Here are a few everyday activities. Please tell me if you have any difficulty with these because OF A HEALTH PROBLEM. Exclude any difficulties you expect to last less than three months.”

IADL: Do you have difficulty with…?

IADL: Yes, no, cannot do it, does not do it, does not know, NR.

IADL measures

MHAS: "**Now I am going to mention other activities. Please tell me if you have any difficulty with the activities that I mention to you. If you do not do any of the following activities, simply tell me. Do not include difficulties that you believe will last less than three months.**"

Because of a health problem, do you have any difficulty...

Yes, no, can't do, doesn't do, DK, RF.

***Is this because of a health problem*?**

Nagi measures - wording

SABE: “We need to know about problems that people may have doing certain activities that are important to daily living BECAUSE OF A HEALTH OR PHYSICAL PROBLEM. Please tell me whether you have (at this time) any difficulty doing any of the activities that I am going to mention. EXCLUDE ANY DIFFICULTIES THAT YOU EXPECT TO LAST LESS THAN THREE MONTHS.”

Do you have any difficulty….?

Yes, no, cannot do it, DK, NR.

Nagi measures - wording

MHAS: “Please tell me if you have any difficulty in doing each of the daily activities that I am going to read. Don’t include difficulties that you believe will last less than three months.”

Because of a health problem, do you have difficulty with….?

Yes, no, cannot do it, does not do it, DK, RF.