



International Seminar on Integrated  
**WATER-Related**  
**Disease Control**

**12-14 May 2014, Norway**

Sorhellinga Building  
Norwegian University of Life Sciences, Ås




# REDUCING DIARRHEA IN CHILDREN AND CONTROLLING DENGUE VECTOR *AEDES AEGYPTI* IN RURAL SCHOOLS IN TWO MUNICIPALITIES IN COLOMBIA



The Research Council  
of Norway

LONDON  
SCHOOL of  
HYGIENE  
& TROPICAL  
MEDICINE





# **PRESENTATION OF NUTRITIONAL SITUATION AMONG CHILDREN IN RURAL SCHOOLS**

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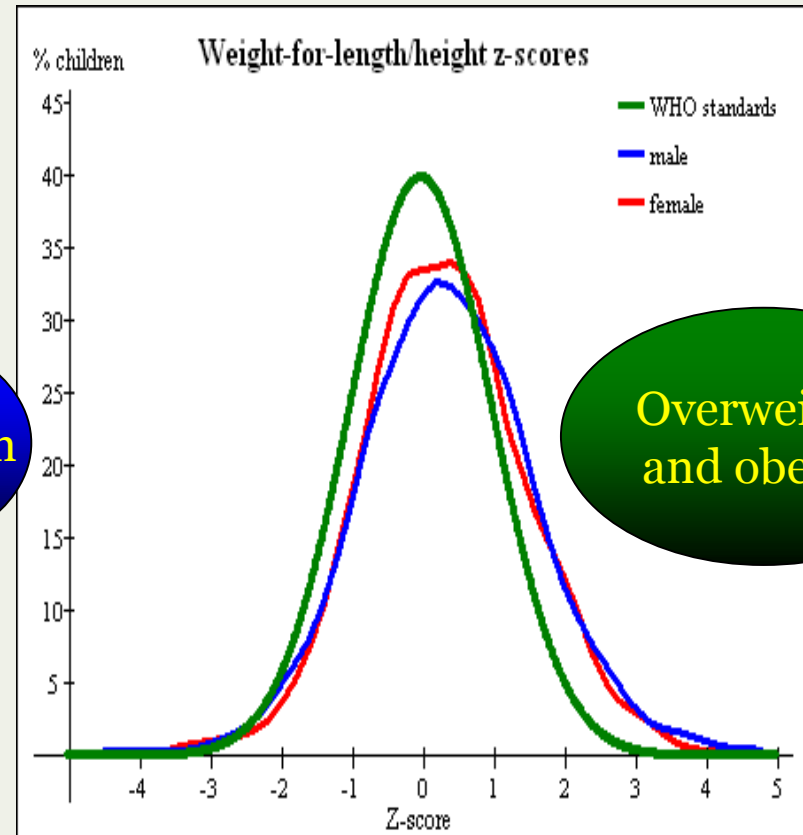
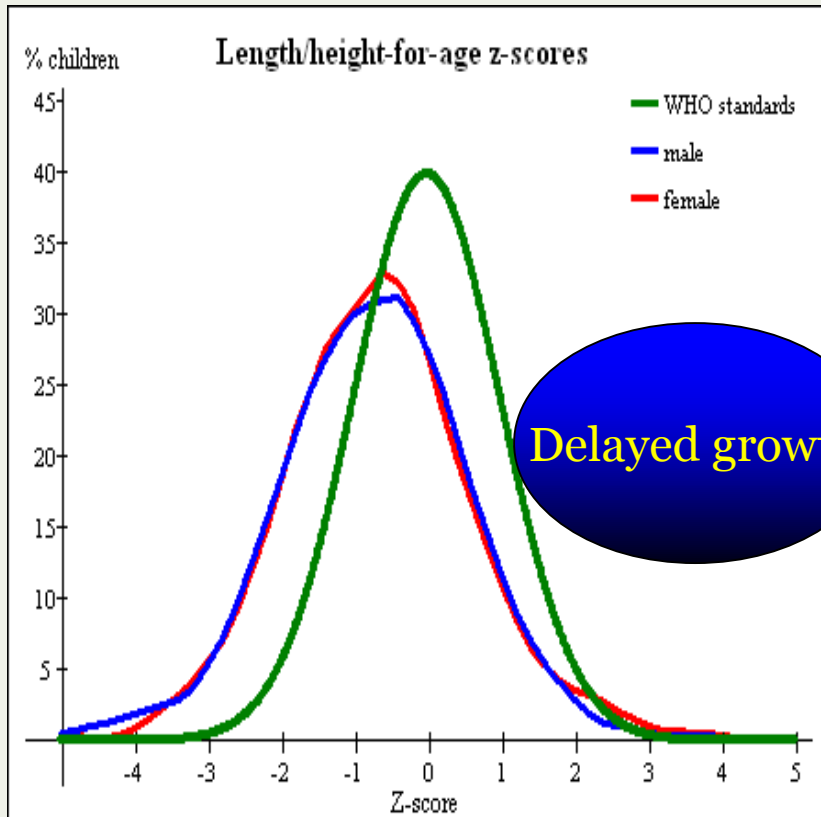
**Instituto de Salud y Ambiente. Facultad de Medicina**

**Universidad El Bosque**

**Bogotá, Colombia**

# DOUBLE BURDEN OF MALNUTRITION

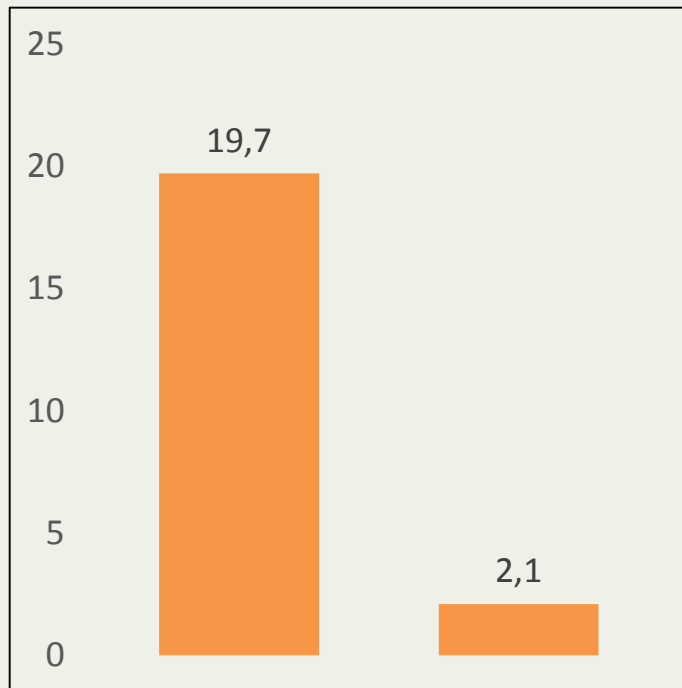
Countries in nutritional transition: problems with malnutrition coexist with overnutrition



# INTRODUCTION

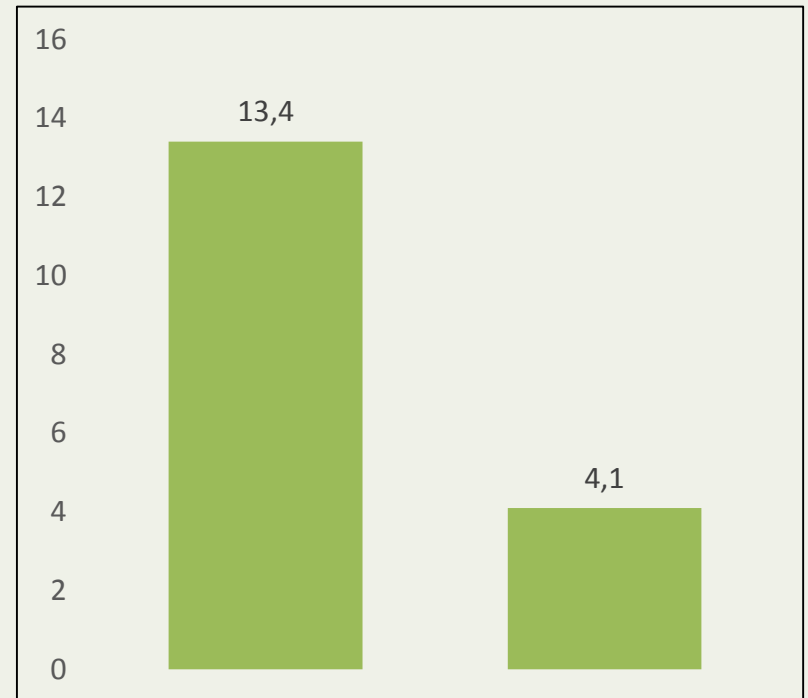
**The double burden of malnutrition in children of 5 to 17 years. Colombia.**

**ENSIN 2010**



Stunting

Thinness



Overweight

Obesity

# STRUCTURAL DETERMINANTS



RURAL SETTLEMENTS  
LA CONCHA, LA MESA

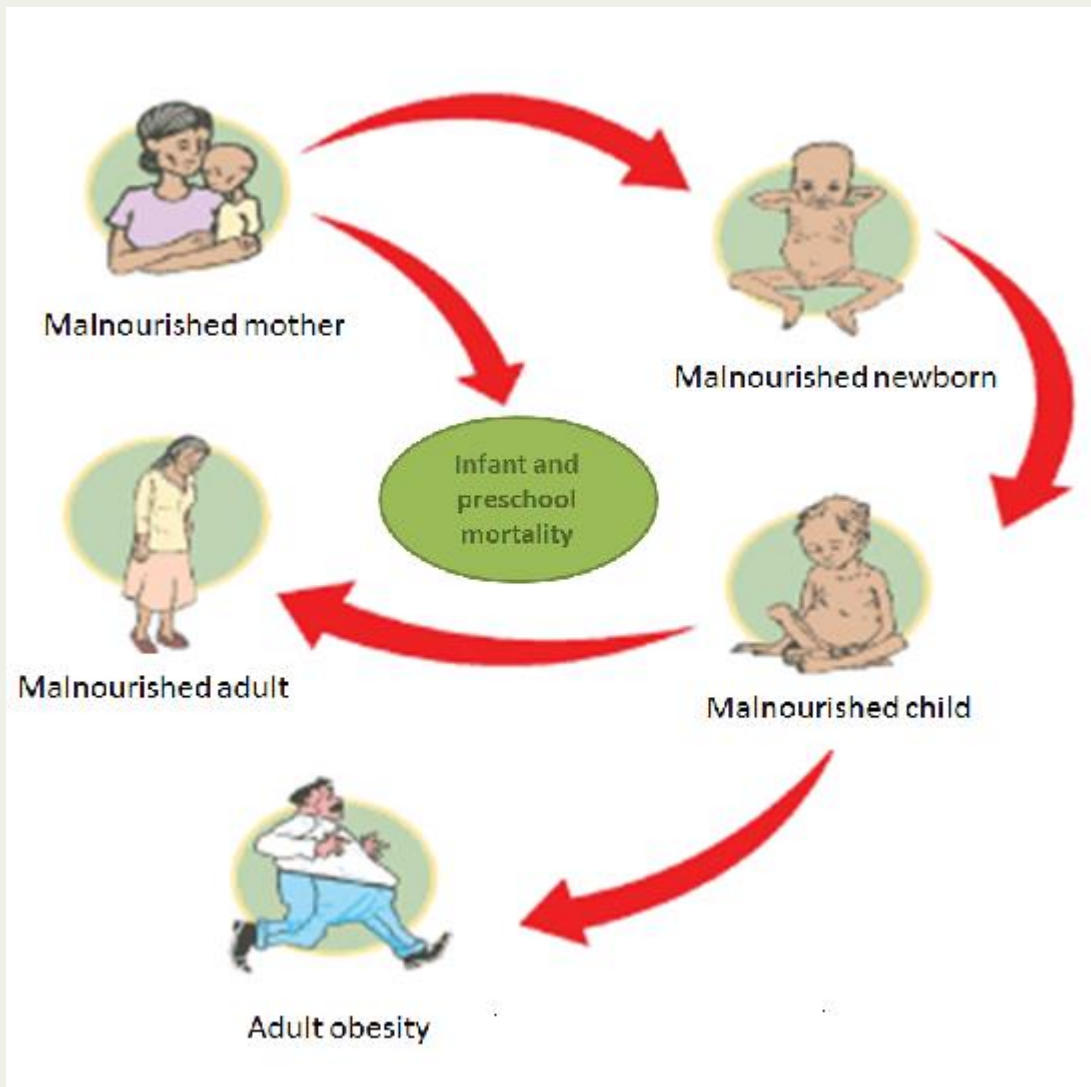
Intermediate determinants

Different exposure

Different vulnerability

Differential results

- Physiological conditions
- Food insecurity
- Malnutrition
- Co-morbidity



Rising poverty levels limits access to education

Malnutrition and hunger, but also obesity have been linked to poor attendance school and poor academic performance

Translated into English: [http://4.bp.blogspot.com/-CN0YVVIqsA8/T4NXK2b3o\\_I/AAAAAAAAACM/XQP2alsPiH0/s400/circulo.gif](http://4.bp.blogspot.com/-CN0YVVIqsA8/T4NXK2b3o_I/AAAAAAAAACM/XQP2alsPiH0/s400/circulo.gif)

## GENERAL OBJECTIVE

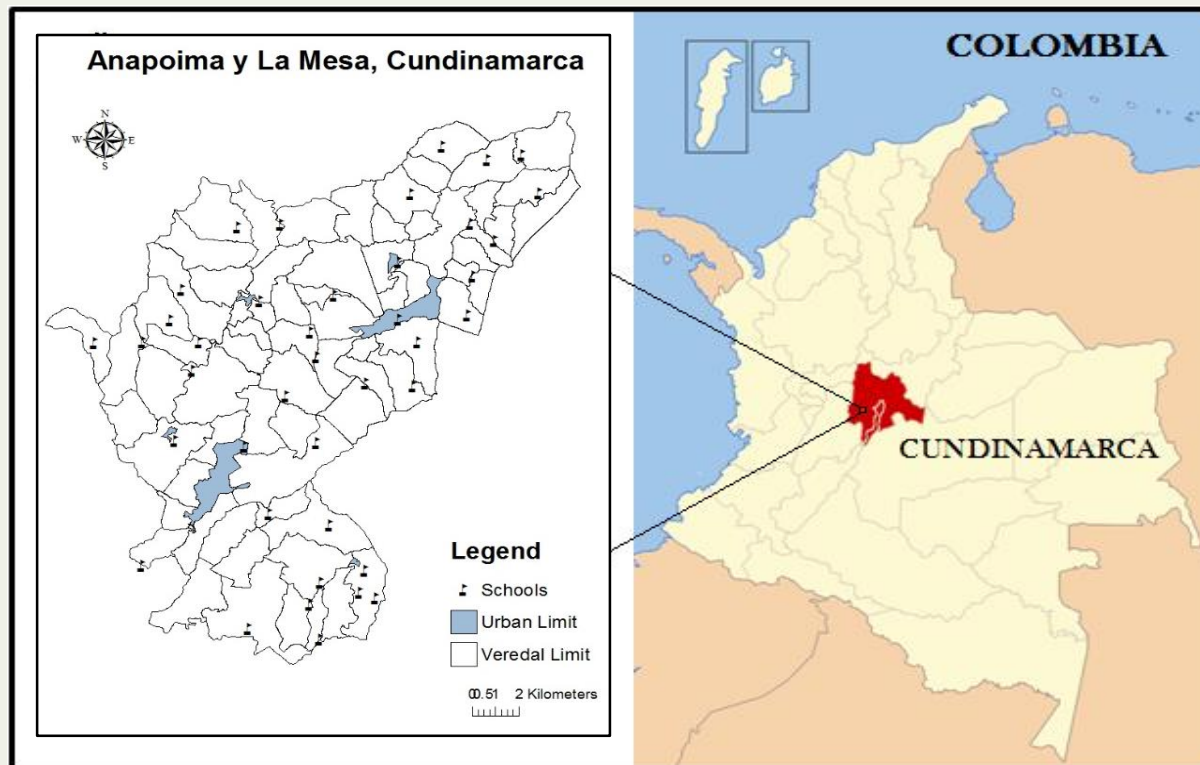
To determine the nutritional status and prevalence of malnutrition in children in rural schools in La Mesa and Anapoima and effects on school absence.



## SPECIFIC OBJECTIVES

1. To compare the frequency and reasons for school absenteeism between children with malnutrition and other children.
2. To describe the most common causes of absence and sickness in the school population.

# AREA AND STUDY POPULATION



Characteristic	Anapoima	La Mesa	Total
Number of children in rural schools	402	551	953
Number of children who were taking anthropometric measurements	347	438	785
Number of schools	17	17	34

# METHODOLOGY



Design: Cross sectional

# METHODOLOGY



Bascule type Seca 813 with a capacity of 140 kg and precision of 10 gram



Height rod type Seca 213 with a maximum capacity of 2 meters and an accuracy of 1mm

VALORACIÓN NUTRICIONAL DE NIÑOS ESCOLARES EN EL ÁREA RURAL DE ANAPOMIA Y LA MESA									
FECHA: 14/12/12									
Nombre de la escuela: El Consuelo			Código: AN		Grado: 0-5				
Nº	NOMBRE	GRADO	FECHA DE NACIMIENT	EDAD		SEXO (FM)	PESO (Kg)		TALLA (cm)
			Años	Meses					
1	José Oscar	0				M	17.9	12.8	111.9
2	Jhony					M	26.1	26.1	111.9
3	William Benito	0				M	14.6	14.6	102.1
4	Bernardo	5	15/12/12			M	50.1	50.2	121.2
5	Ricardo					F	31.2	34.5	153.6
6									
7									
8									
9									
10									
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22									
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24									

Twice the size and weight of each child

## METHODOLOGY



## SCHOOL LAGUNA NUEVA, LA MESA

[illegible]



# METHODOLOGY

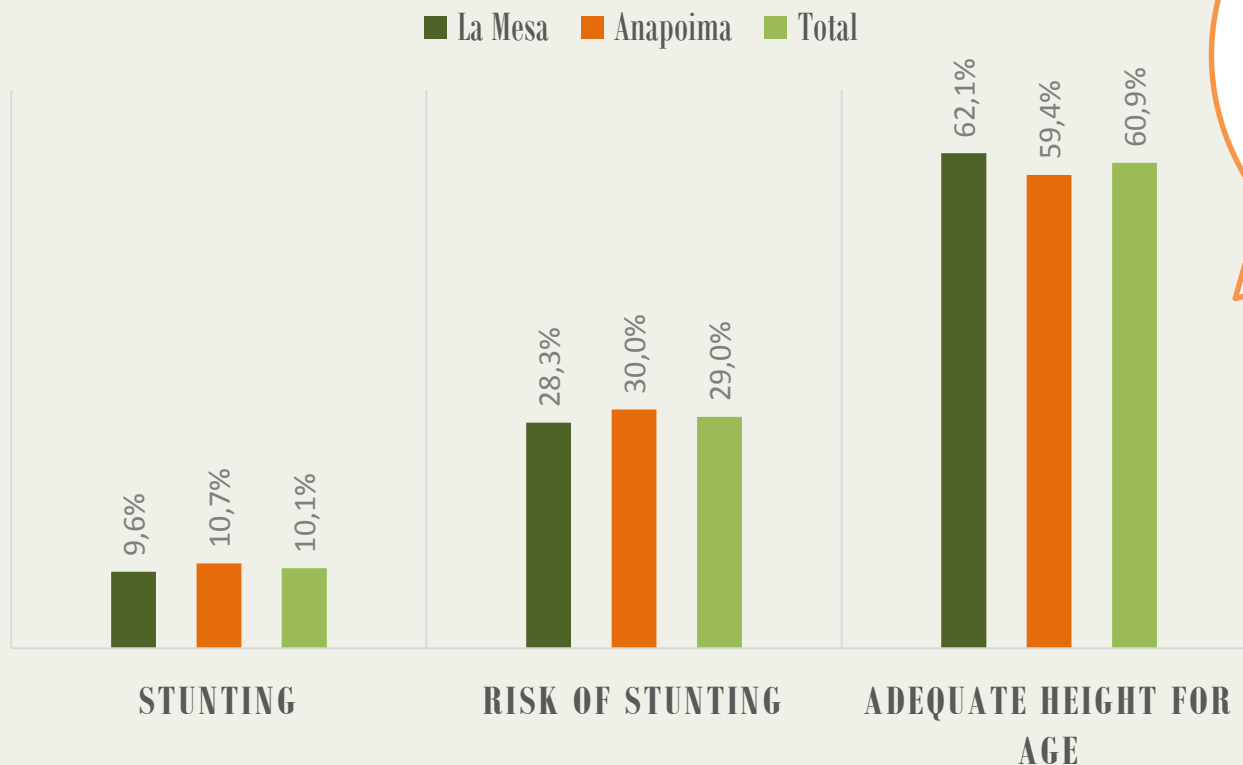
## Classification criteria of nutritional status of children from 5 to 16 years

INDICATOR	CLASSIFICATION	CUTOFF POINT
Height for age	Low height for age or size delay	Less than -2 SD
	Risk of low height	Greater than or equal to -2 and less than -1 SD
Body mass index	Thinness	Less than -2 DE
	Overweight	Greater than 1 and less than or equal to 2 SD
	Obesity	More than 2 SD

According to Resolution 2121 of June 9, 2010

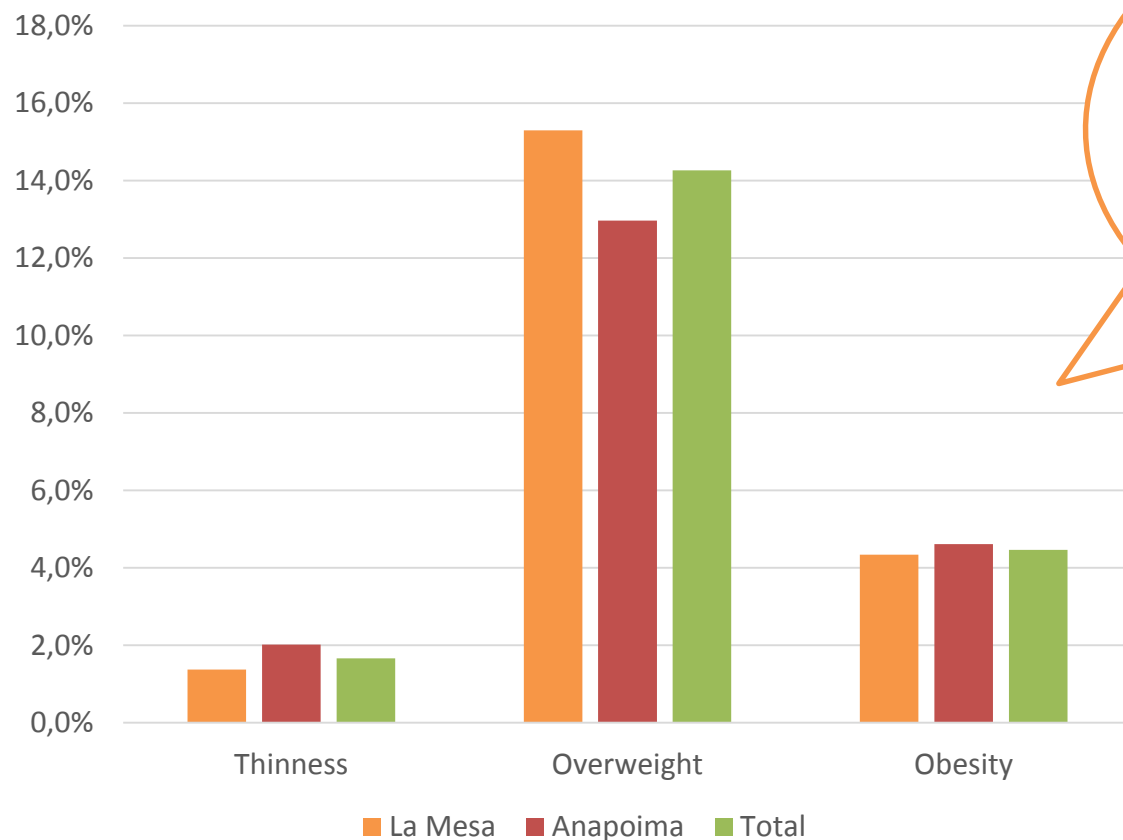
The data were analyzed with the AnthroPlus and SPSS v17.0. The association between absence and nutritional status was estimated with Pearson's Chi-square test with 95% confidence intervals 5% significance level.

# DIAGNOSTIC HEIGHT FOR AGE



**Colombia, ENSIN  
2010:  
Stunting children  
5 -17 years-old:  
Rural: 15,0 %  
Urban: 7,9%**

# DIAGNOSTIC BY BODY MASS INDEX (BMI)



Colombia, ENSIN 2010,  
children

5-17 years-old:

Overweight: 13,4%

Obesity: 4,1%

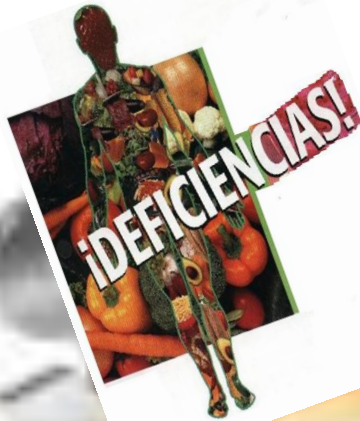
Thinness: 2,1%



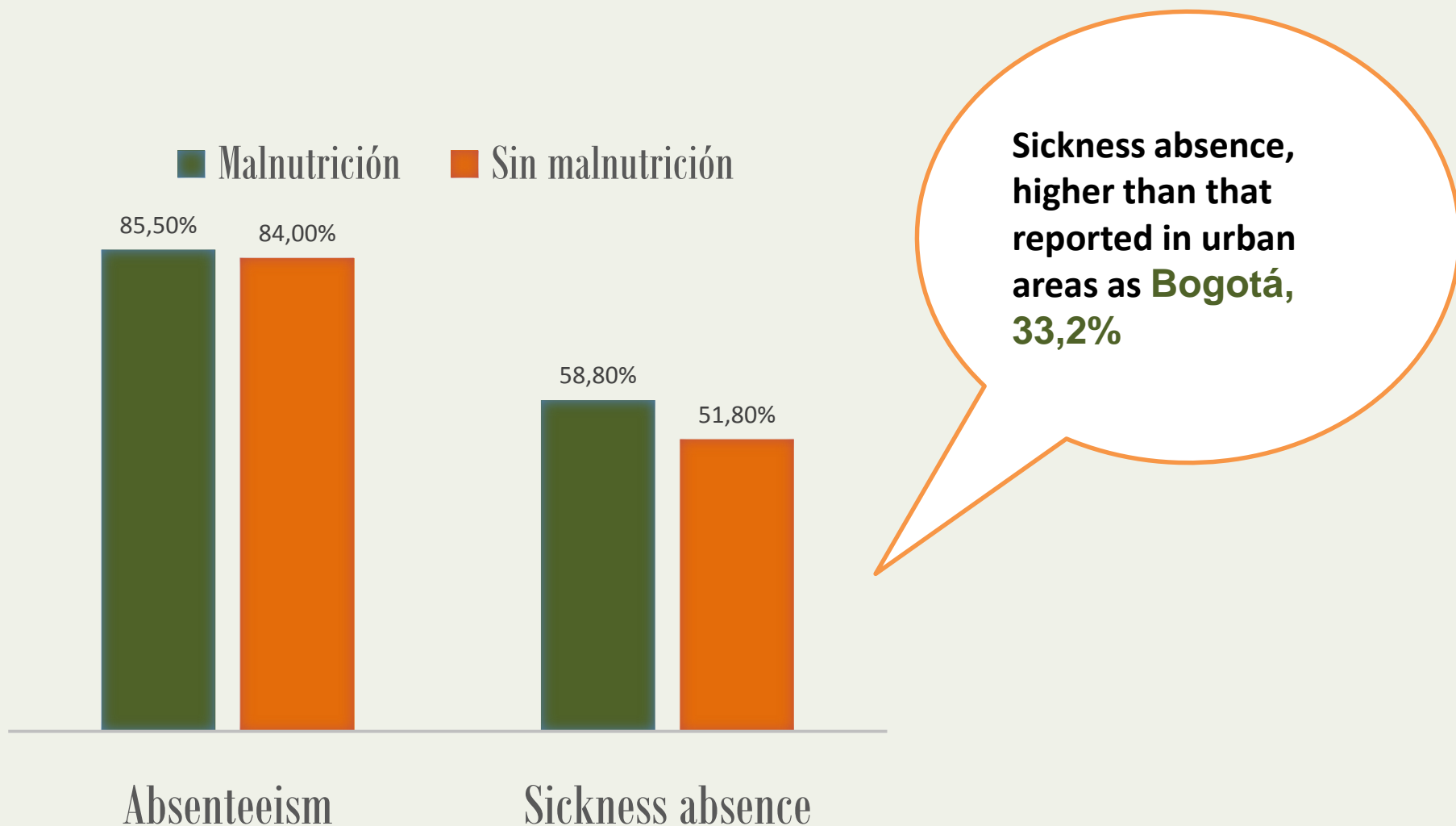
# DOUBLE BURDEN OF MALNUTRITION

Stunting: 10,06%

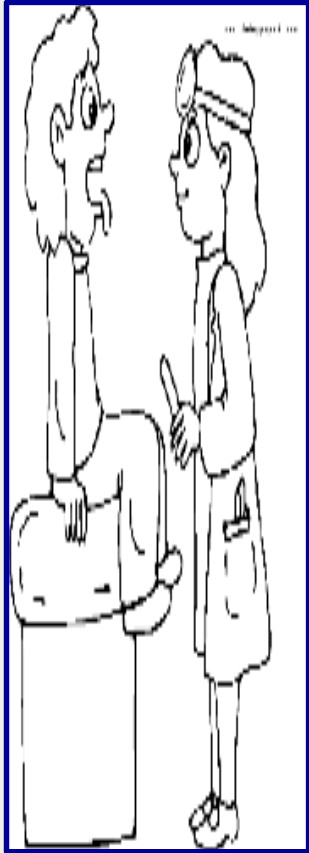
Overweight:  
22,04 %



## ABSENCE DUE TO ANY REASON AND ABSENCE DUE SICKNESS



# REASONS FOR SCHOOL ABSENTEEISM



**OTHERS REASON**

**35%**



**ILLNESS**

**28%**



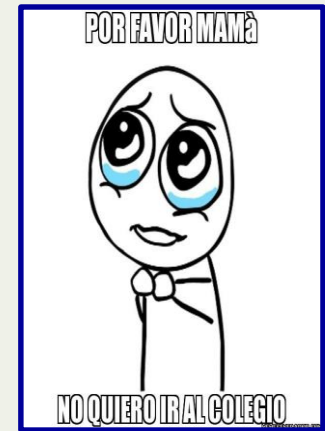
**TRAVEL**

**18%**



**BAD WEATHER**

**12%**



**DOES NOT WANT TO GO**

**8%**

# REASONS FOR SICKNESS ABSENCE



**FLU**  
**31,9%**



**DIGESTIVE  
SYMPTOMS**  
**23,2%**



**FEVER**  
**12%**



**TRAUMA**  
**8,1%**



**HEADACHE:**  
**6,5%**

# RELATION BETWEEN NUTRITIONAL STATUS AND SEX AND AGE

CHARACTERISTICS OF CHILDREN AND ADOLESCENTS	STUNTED PREVALENCE RATIO (95% CI)	OVERWEIGHT PREVALENCE RATIO (95% CI)	OBESITY PREVALENCE RATIO (95% CI)
Age (years)			
5-9 (Reference group)	1	1	1
10-16	0,438 (0,313-0,729)	0,930 (0,644-1,343)	0,701 (0,362-1,360)
Sex			
Female (Reference group)	1	1	1
Male	0,721 (0,466-1,117)	0,660 (0,464-0,937)	0,485 (0,242-0,972)

# RELATION BETWEEN NUTRITIONAL STATUS AND OVERALL ABSENTEEISM

OVERALL ABSENTEEISM	ADEQUATE HEIGHT FOR AGE	BMI FOR AGE	STUNTED	OVERWEIGHT OR OBESITY
Rate of absence episodes / child / year	1,0	0,95	0,96	0,98
Rate of absence days / child / year	8,17	8,04	10,66 *	9,09 *
Prevalence ratio (95% CI)	1,0	1,0	1,061 (0,973-1,158)	1,0 (0,92-1,08)

\*  $P < 0,05$

# RELATION BETWEEN NUTRITIONAL STATUS AND OVERALL ABSENTEEISM

SICKNESS ABSENTEEISM	ADEQUATE HEIGHT FOR AGE	BMI FOR AGE	STUNTED	OVERWEIGHT OR OBESITY
Rate of sickness absence episodes / child / year	0,64	0,61	0,72	0,64
Rate of sickness absence days / child / year	2,47	2,30	3,42 *	2,98 *
Prevalence ratio (95% CI)	1,0	1,0	1,01 (0,81-1,25)	1,08 (0,91-1,27)

\*  $P < 0,05$

# RELATION BETWEEN NUTRITIONAL STATUS AND SICKNESS ABSENCE

Prevalence ratio (95% CI)

Absence due to	Child is stunted		Child is overweight or obese	
	No	Yes	No	Yes
Diarrhea	1	1,33 (0,67 - 2,62)	1	0,90 (0,48 -
Fever	1	1,33 (0,72 - 2,44)	1	0,94 ( 0,54 -
Flu	1	0,95 (0,64 - 1,42)	1	0,85 (0,64 - 1,14)
Fever dengue	1	0,39 (0,05 - 2,81)	1	4,38 (1,62 - 11,90)

Kalayanarooj, S et al (Tailandia, 2005) and Pichainarong, N, et al (Tailandia, 2006)



# CONCLUSIONS

- Coexistence of malnutrition and obesity in the same scenario. Programs aim at reducing malnutrition and not overweight.” And “It is important to consider these differences in nutritional programs in schools.



# CONCLUSIONS

Overweight and stunting are associated with more days of sickness absence.

Probable dengue was more common in overweight children.



# SOURCES OF IMAGES AND FIGURES

## Diapositiva 7

- ✓ Translated into English: [http://4.bp.blogspot.com/-CN0YVVIqsA8/T4NXK2b3o\\_I/AAAAAAAAACM/XQP2alsPiH0/s400/circulo.gif](http://4.bp.blogspot.com/-CN0YVVIqsA8/T4NXK2b3o_I/AAAAAAAAACM/XQP2alsPiH0/s400/circulo.gif)

## Diapositiva 17

- ✓ <http://www.freewebs.com/nutricion-total/excesos%20y%20def.JPG>
- ✓ <http://us.cdn4.123rf.com/168nwm/ayzek/ayzek1105/ayzek110500205/9596738-balance-between-dollar-and-euro.jpg>

## Diapositiva 19

- ✓ Otros: <http://es.123rf.com/imagenes-de-archivo/enfermos.html>
- ✓ Enfermedad: [http://lh5.ggpht.com/\\_\\_ock0u\\_yh\\_A/S7vqYoKDSHI/AAAAAAAAAD\\_k/9SpkSYwScrk/medicos,%20hospitales%20%2816%29\\_thumb.gif?imgmax=800](http://lh5.ggpht.com/__ock0u_yh_A/S7vqYoKDSHI/AAAAAAAAAD_k/9SpkSYwScrk/medicos,%20hospitales%20%2816%29_thumb.gif?imgmax=800)
- ✓ Mal clima: <http://2.bp.blogspot.com/-bfJ4ARS6Kcc/UDeWQC4hEWI/AAAAAAAAABkg/QptiS9TuuFI/s320/lluvia.jpg>
- ✓ Viaje: <http://www.reproduccionasistida.org/wp-content//Dibujo-Natalia2.png>
- ✓ No quiere ir a la escuela: <http://www.escuelaenlanube.com/wp-content/uploads/2013/04/nmjh23.jpg>

## Diapositiva 20

- ✓ Resfriado común <http://es.123rf.com/imagenes-de-archivo/enfermos.html>
- ✓ Fiebre: [http://4.bp.blogspot.com/\\_n9LT6tDwZXE/Swb29UViY7I/AAAAAAAEKE/nckdQyeffz4/s1600/es-colorear-dibujos-imagenes-foto-fiebre-p11830.jpg](http://4.bp.blogspot.com/_n9LT6tDwZXE/Swb29UViY7I/AAAAAAAEKE/nckdQyeffz4/s1600/es-colorear-dibujos-imagenes-foto-fiebre-p11830.jpg)
- ✓ Problemas digestivos: <http://www.padreshispanos.com/salud-infantil/el-dolor-abdomi/228/>
- ✓ Dolor de cabeza: <http://es.123rf.com/imagenes-de-archivo/enfermos.html>
- ✓ Trauma: <http://us.123rf.com/400wm/400/400/antonbrand/antonbrand1205/antonbrand120500012/13664144-patinador-de-la-historieta-caa-da-de-su-patineta-aislado.jpg>





SCHOOL SAN ESTEBAN, LA MESA

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