



# Measuring the impact on well-being and health of an urban regeneration program in Chile

## The RUCAS study

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# Two knowledge gaps: Limited evidence, lack of studies on UR in LA

Review article

Evaluating the health effects of place-based slum upgrading physical environment interventions: A systematic review (2012–2018)<sup>☆</sup>

Rosie Mae Henson<sup>a,\*</sup>, Ana Ortigoza<sup>a</sup>, Kevin Martinez-Folgar<sup>a,b</sup>, Fernando Baeza<sup>c</sup>, Waleska Caiaffa<sup>d</sup>, Alejandra Vives Vergara<sup>c,e</sup>, Ana V. Diez Roux<sup>a</sup>, Gina Lovasi<sup>a</sup>

“Limited strong evidence and the diffuse nature of comprehensive interventions suggests a need for attention to measurement of intervention exposure and analytic approaches to account for confounding and selection bias in evaluation. In addition to health improvements, evaluators should consider unintended health consequences and environmental impact”



Friche et al., *Urban upgrading and its impact on health: a "quasi-experimental" mixed-methods study protocol for the BH-Viva Project*, 2015



Egan et al., *Protocol for a mixed methods study investigating the impact of investment in housing, regeneration and neighbourhood renewal on the health and wellbeing of residents: the GoWell programme*, 2010

# The RUCAS project

## General project aim:

The RUCAS Project aims to evaluate the health and wellbeing effects of the intervention in two villas, capitalizing on the intervention as a natural experiment.





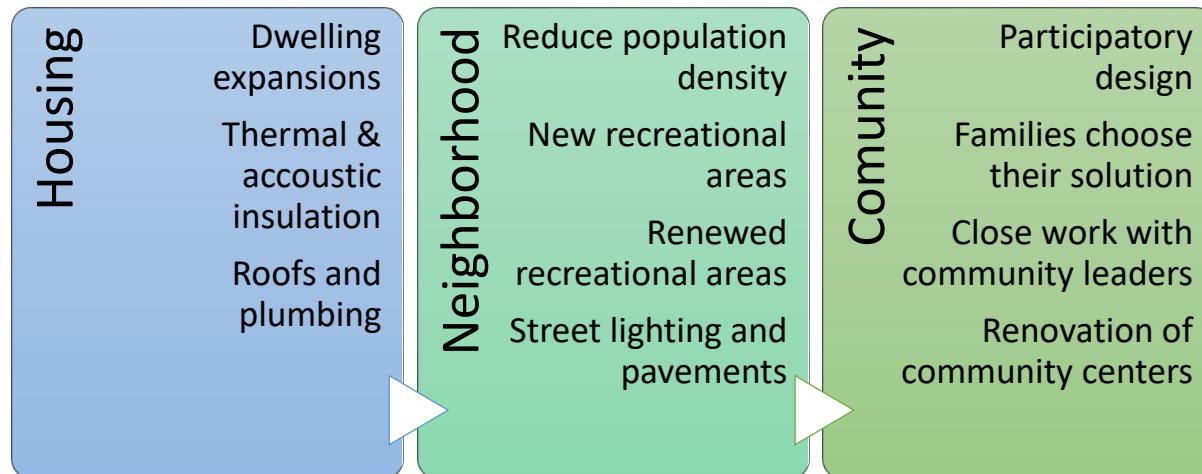
# The intervention:

## Urban regeneration program for social housing *villas*

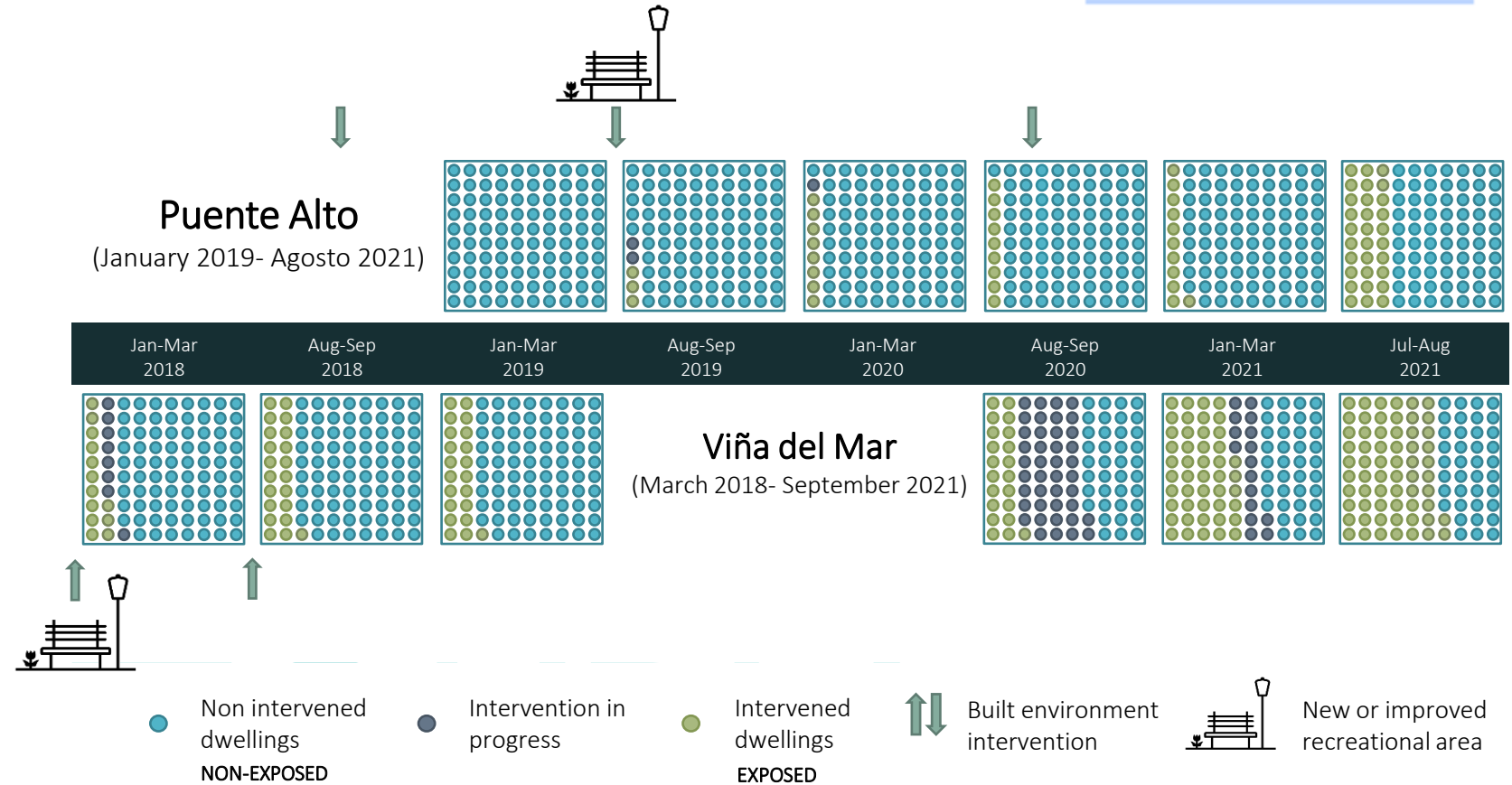
Programa de regeneración de conjuntos habitacionales

Ministerio de Vivienda y Urbanismo - Chile

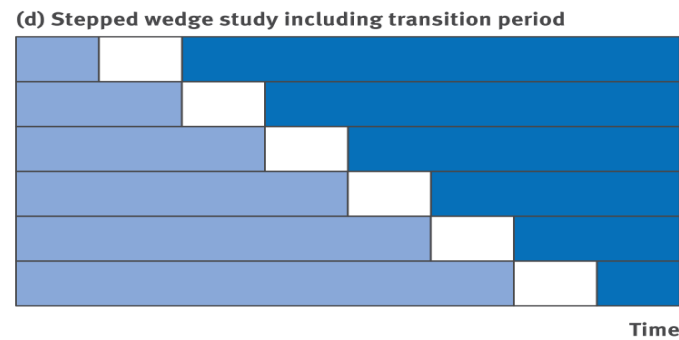
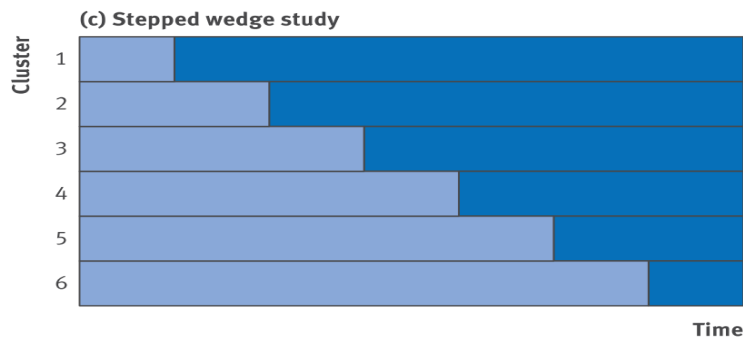
**AIM: Regenerate social housing complexes** whose urban-residential configuration is insufficient or deteriorated (accessibility, roads, recreational green spaces, equipment, density, community organization)



# Study design

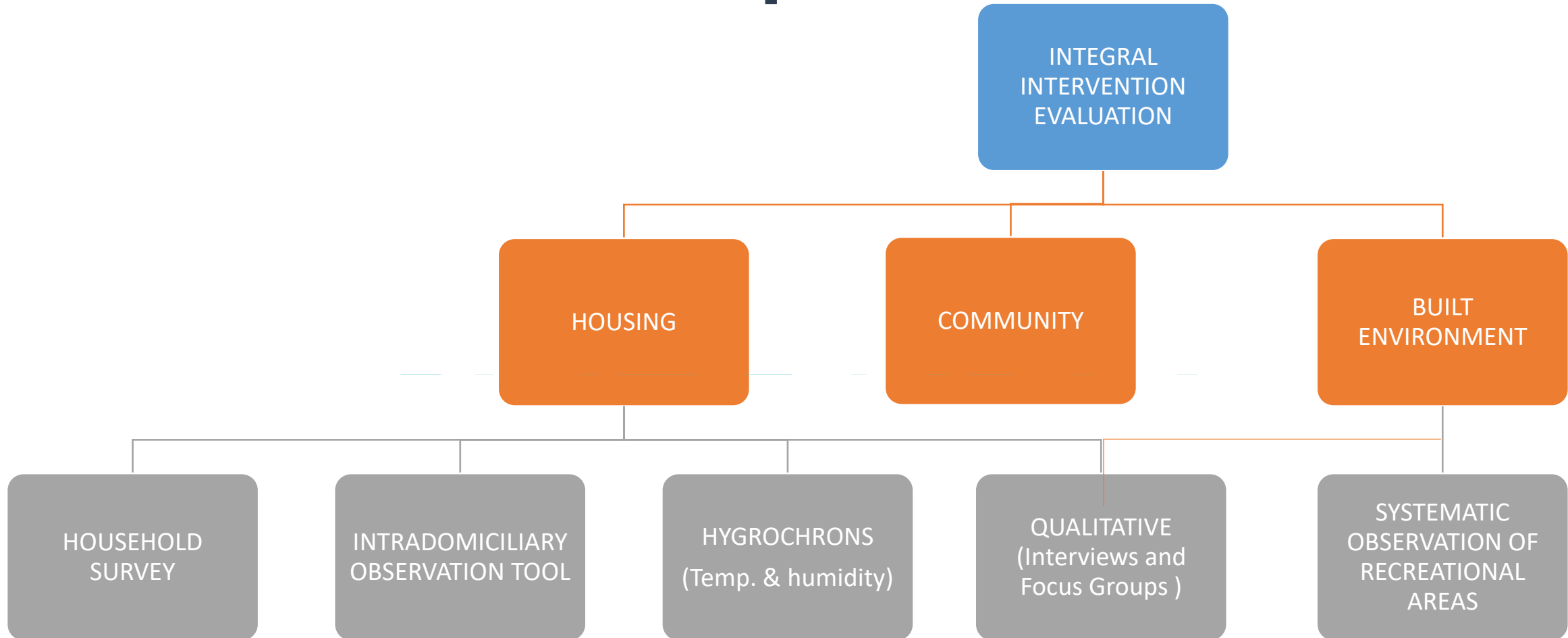


## Stepped wedge design

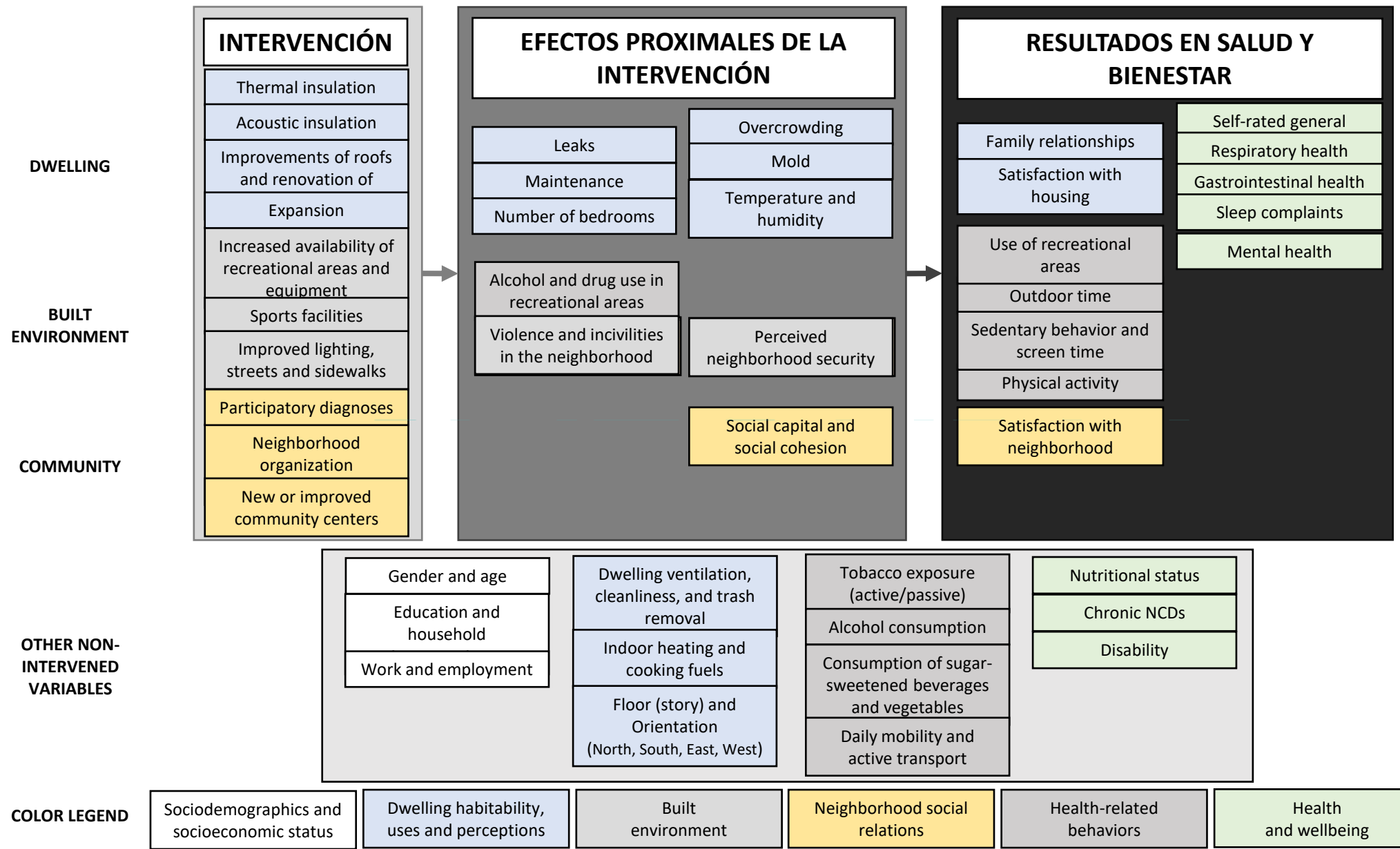


Hemming, K., et al. (2015). The stepped wedge cluster randomised trial: Rationale, design, analysis, and reporting. *BMJ (Online)*, 350.

# Instruments: multiple methods



# Conceptual Framework



# Baseline sample characteristics

Measurement date	VIÑA DEL MAR Abril 2018	PUENTE ALTO January 2019
<b>Sample size</b>		
Number of households	238	718
Number of people	682	2448
<b>Sociodemographic characteristics</b>		
Gender		
	<i>Men</i>	46.8%
	<i>Women</i>	53.2%
Age groups		
	<b>0-15</b>	<b>26.0%</b>
	16-25	14.7%
	26-45	28.2%
	46-65	24.4%
	66-99	6.8%
Educational level in years of study (adults ≥ 18 years)		
	<i>Less than 4 years</i>	6.2%
	<i>Between 4 and 7 years</i>	9.9%
	<b>Between 8 and 12 years</b>	<b>65.7%</b>
	<i>More than 12 years</i>	18.3%

Baeza F, Vives A, González F, Orlando I, Valdebenito R, Cornejo A, Slesinski C, Diez Roux A. (2021). The Regeneración Urbana, Calidad de Vida y Salud-RUCAS project: a Chilean multi-methods study to evaluate the impact of urban regeneration on resident health and wellbeing. *BMC public health*, 21(1), 1-15.



# RESULTS



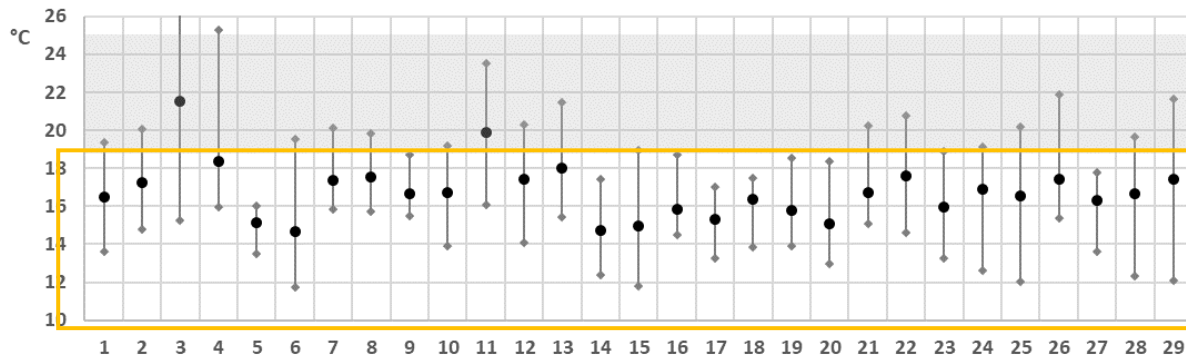
1 Mourtzoukou, E. G., & Falagas, M. E. (2007). ; 2 Keatinge, W. R. (1997). ; 3 WHO guidelines for indoor air quality: household fuel combustion, <https://www.who.int/airpollution/publications/household-fuel-combustion/en/>; 4 Fisk et al, 2007; Pekkanen et al, 2007; Karvonen et al, 2014; Quansah et al, 2012.; 5 Marto, 2006; Eisenman, 2016; Kinney, 2018 ; 6 Loenhout, 2016; Kusaka, 2013

# Hygrothermal comfort: base line

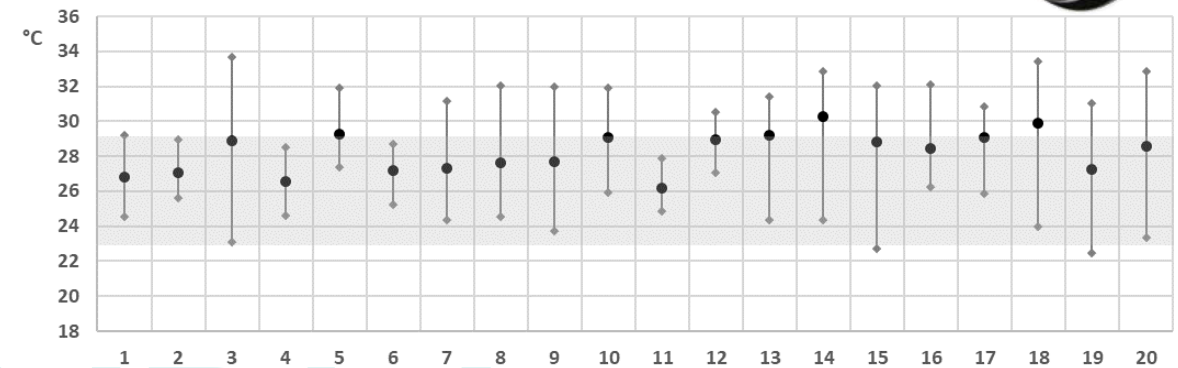
PUENTE ALTO



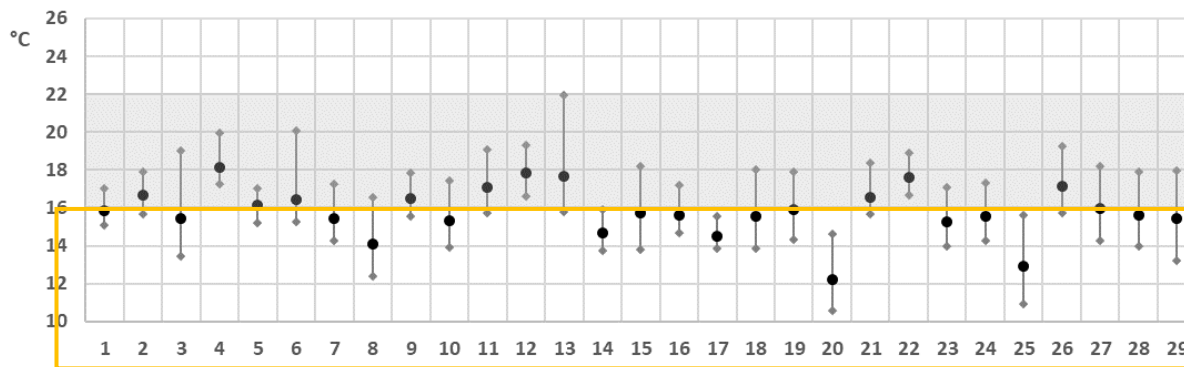
W 2: WINTER 2019



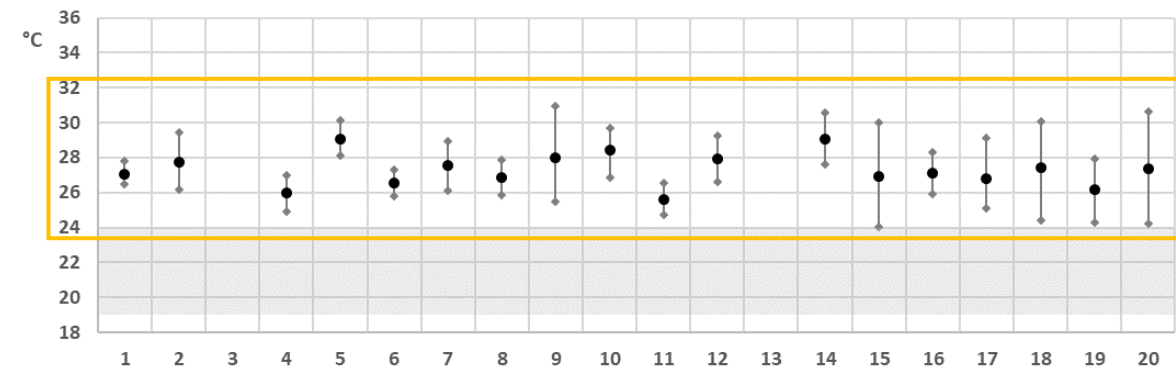
WAVE 3: SUMMER 2020



Temperature: Livingroom - day



Temperature: Bedroom- night



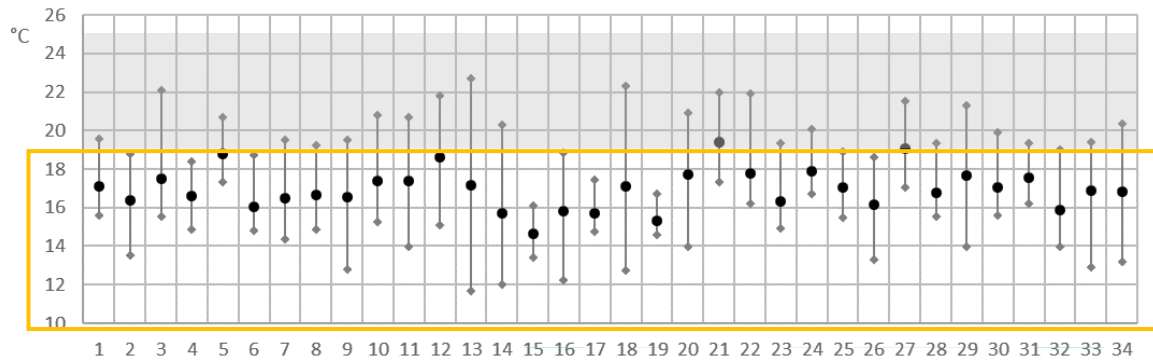
Mean temperatures during a two week period (mean, min and max).  
In gray, confort zone.

# Hygrothermal confort: base line

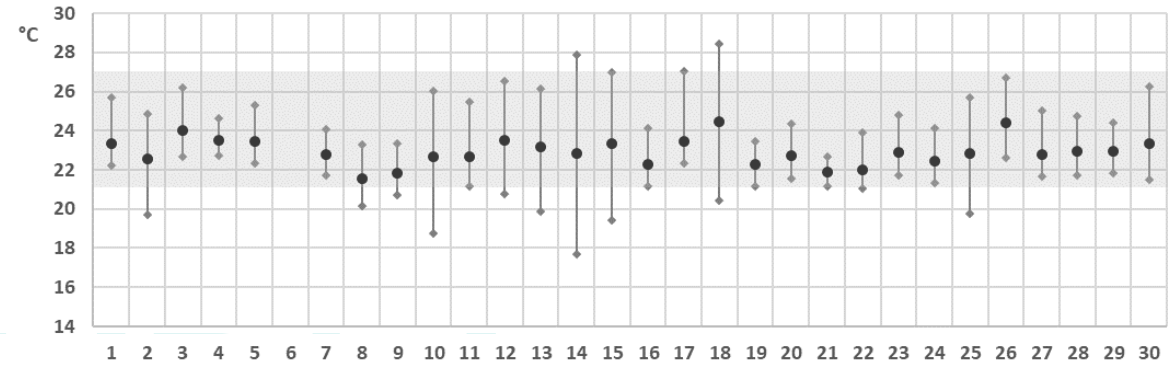
VIÑA DEL MAR



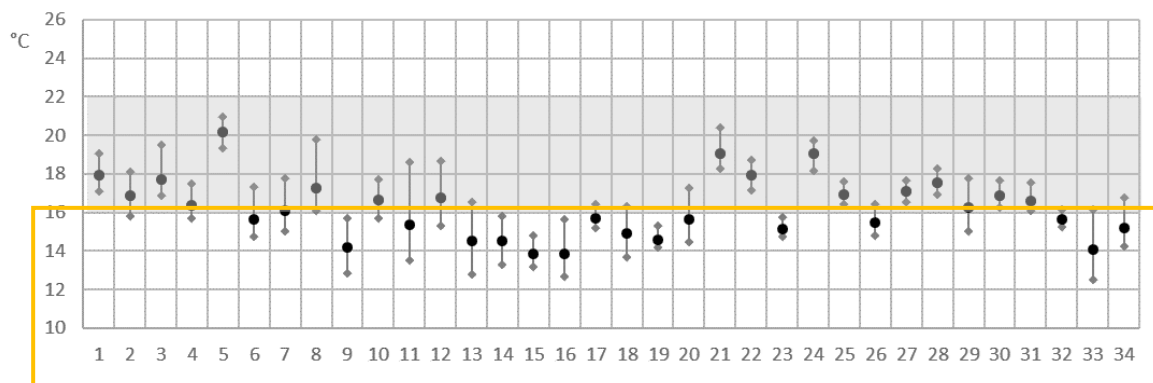
**OLA 2: INVIERNO 2018**



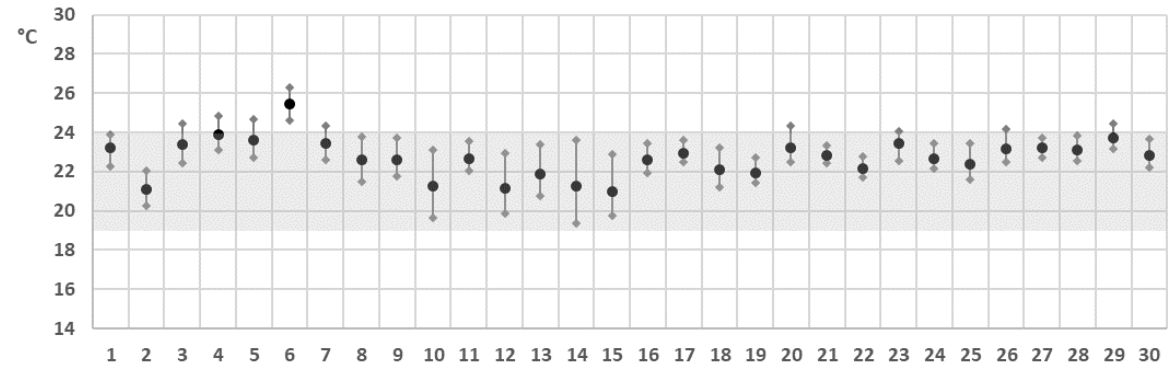
**OLA 3: VERANO 2019**



**Temperatura: Living – día**



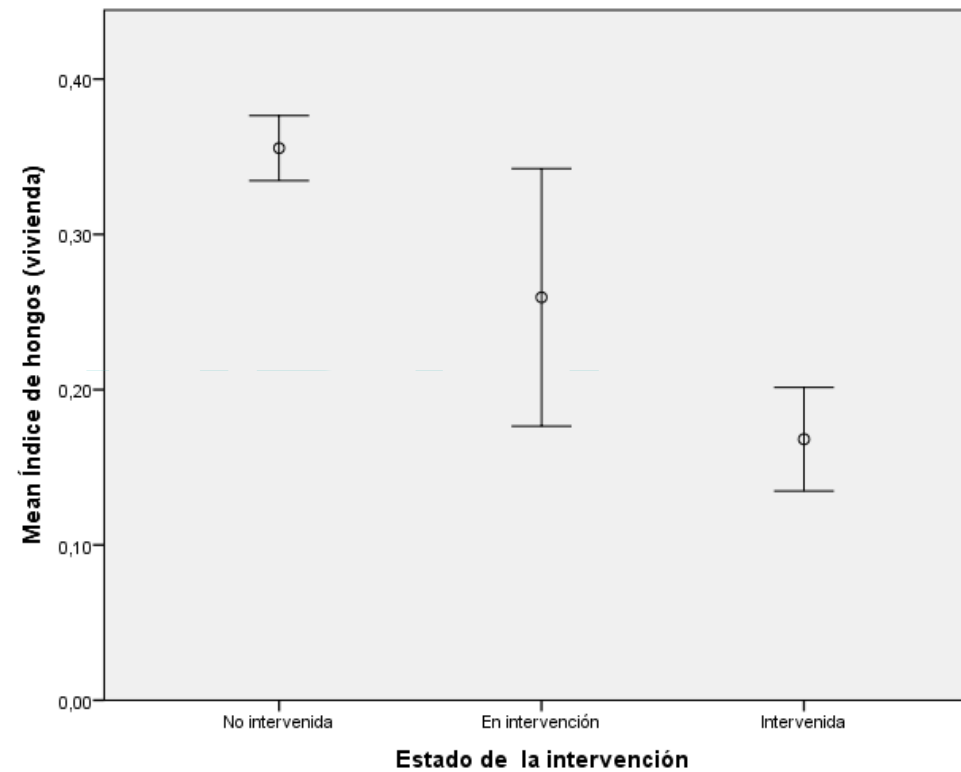
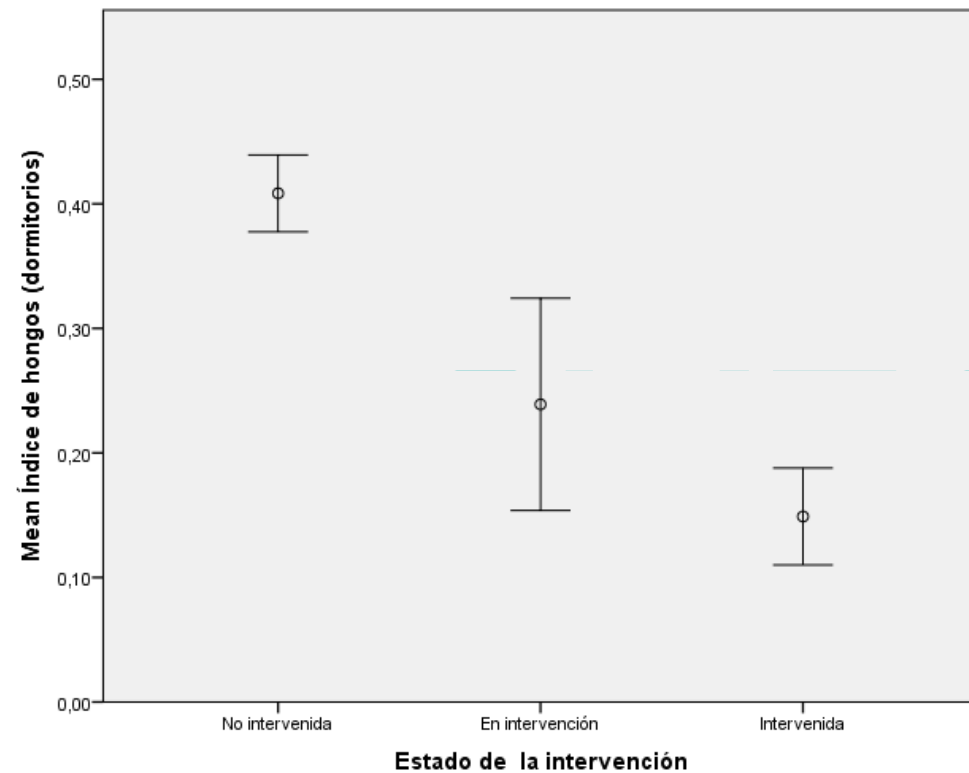
**Temperatura: Dormitorio – noche**



Mean temperatures during a two week period (mean, min and max). In gray, confort zone.

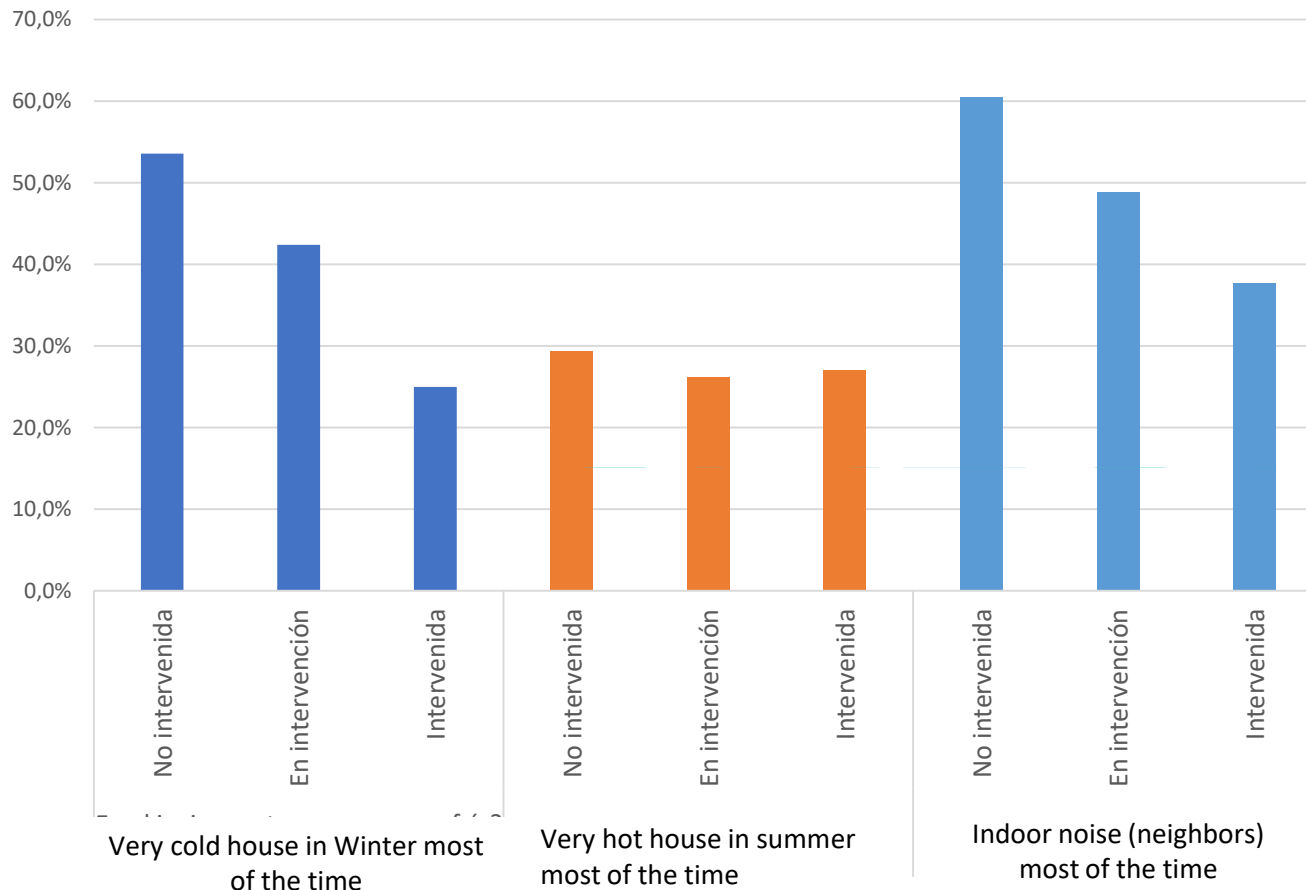
# Intervention evaluation: Mold in walls and ceilings

## Viña del Mar





# Intervention evaluation: Thermal and acoustic insulation Viña del Mar

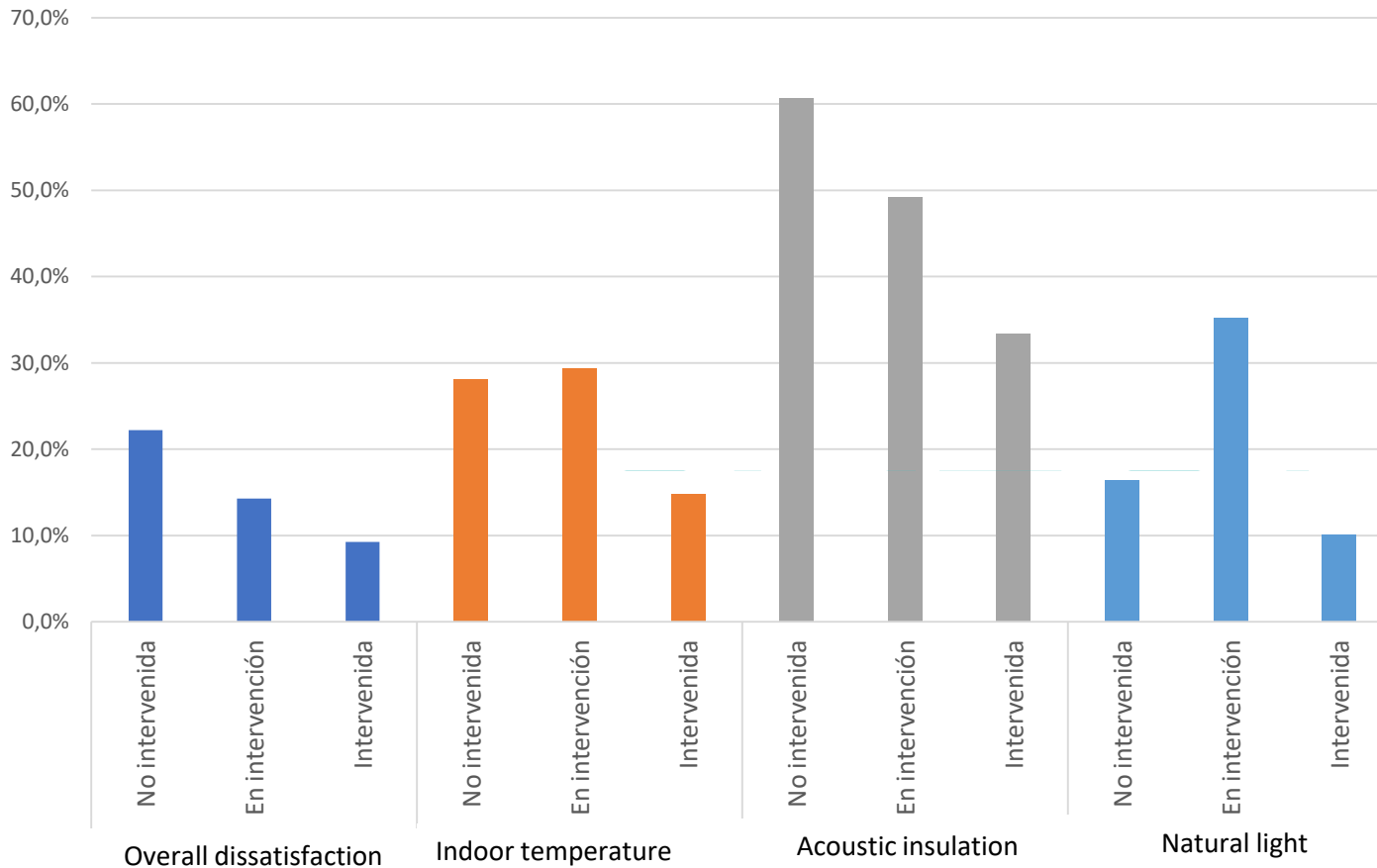


		OR adj	IC (95%)
House very cold in winter (always or almost always) *	Non intervened	1	-
	In intervention	0,658	(0,374 - 1,158)
	Intervened	<b>0,143</b>	<b>(0,065 - 0,315)</b>
House very hot in summer (always or almost always) *	Non intervened	1	-
	In intervention	0,633	(0,326 - 1,231)
	Intervened	<b>0,7</b>	<b>(0,345 - 1,419)</b>
Indoor noise (annoying conversations and noises from neighboring homes)**	Non intervened	1	-
	In intervention	0,498	(0,266 - 0,934)
	Intervened	<b>0,237</b>	<b>(0,106 - 0,53)</b>

\* Adjusted for sex, age, household SES, people per bedroom and seasonality.

\*\* Adjusted for sex, age, household SES, people per bedroom .

# Intervention evaluation: Dissatisfaction with the dwelling

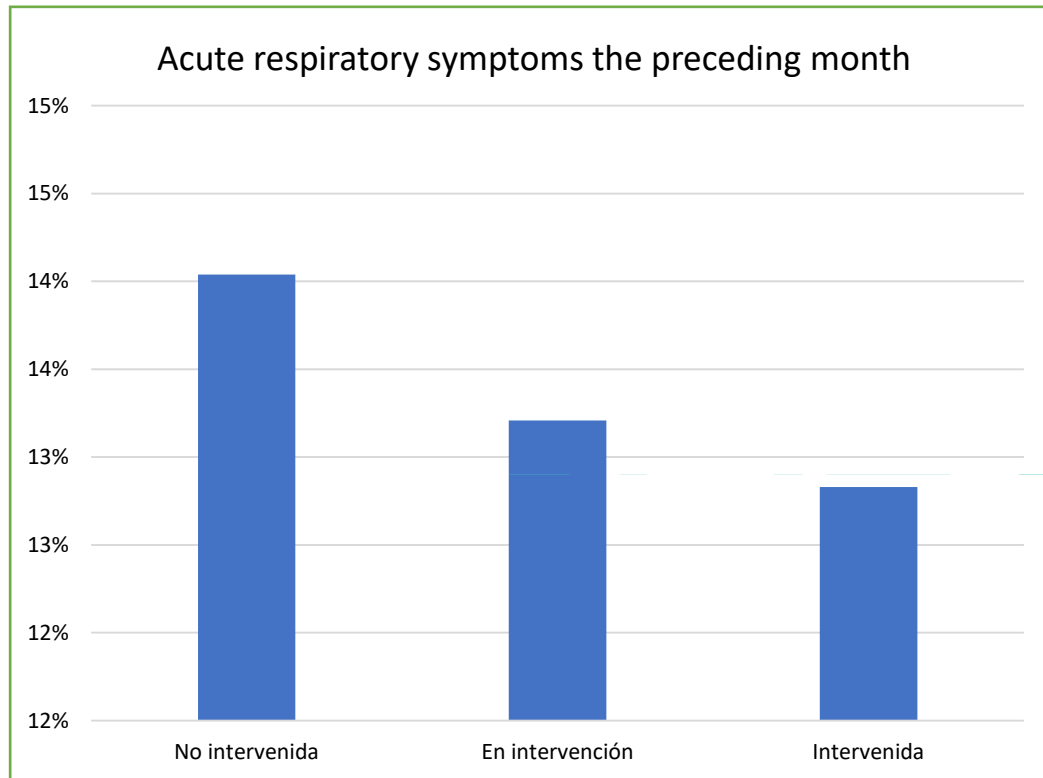


		OR adj	IC (95%)
Overall dissatisfaction*	Non intervened	1	-
	In intervention	0,613	(0,336 - 1,119)
	Intervened	<b>0,325</b>	<b>(0,15 - 0,703)</b>
Dissatisfaction with indoor temperature*	Non intervened	1	-
	In intervention	1,281	(0,747 - 2,194)
	Intervened	<b>0,365</b>	<b>(0,181 - 0,738)</b>
Dissatisfaction with acoustic insulation*	Non intervened	1	-
	In intervention	0,469	(0,279 - 0,787)
	Intervened	<b>0,228</b>	<b>(0,121 - 0,429)</b>
Dissatisfaction with natural light*	Non intervened	1	-
	In intervention	7,79	(3,364 - 18,039)
	Intervened	<b>0,515</b>	<b>(0,182 - 1,455)</b>

\* Adjusted by gender, age, SES, people per bedroom and seasonality.

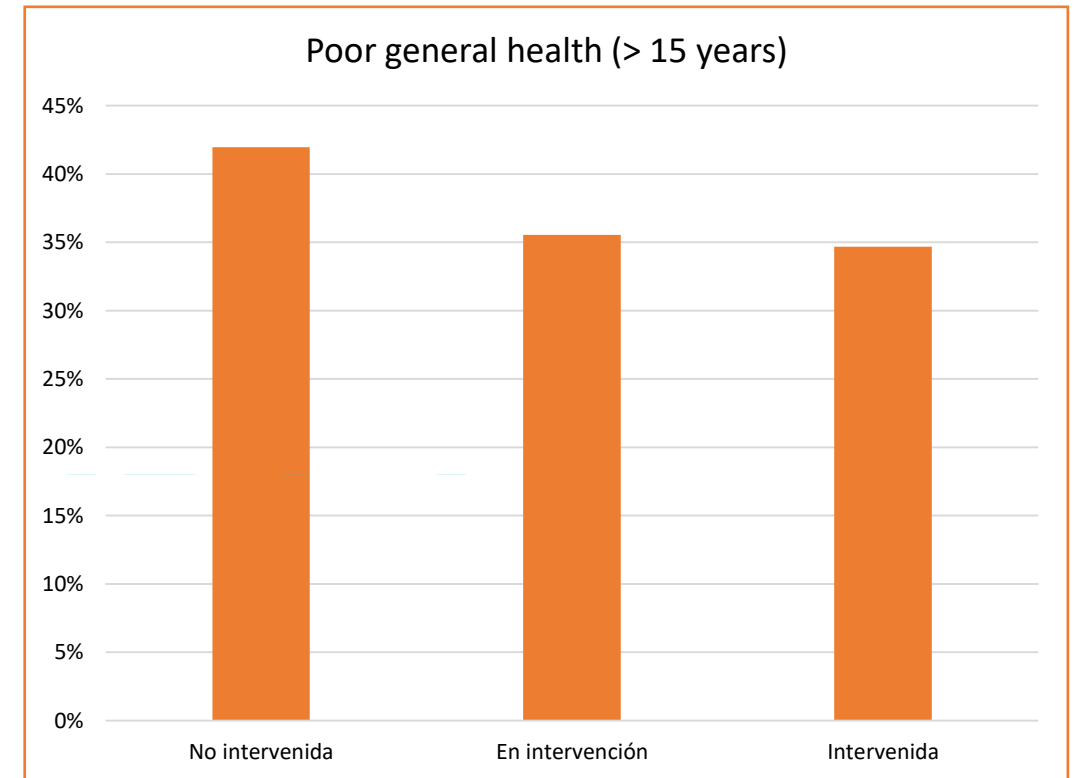
# Intervention evaluation: General health

## Viña del Mar



	OR adj*	IC (95%)
Acute respiratory symptoms (past month)	Not intervened	1
	In intervention	1,589 (0,543 - 4,65)
	<b>Intervened</b>	<b>0,885 (0,474 - 1,652)</b>

\* Ajustado por sexo, edad , NSE, antecedentes de enfermedades crónicas y estación.



	OR adj**	IC (95%)
Poor general health	Not intervened	1
	In intervention	0,956 (0,373 - 2,447)
	<b>Intervened</b>	<b>0,662 (0,38 - 1,151)</b>

\*\* Ajustado por sexo, edad, NSE y estación.

# Cualitative study: Viña del Mar

## Non intervened dwelling

*"In her bedroom I preferred to put a cabin inside and a small bed, as long as she didn't drown in space. So I had to enlarge it towards the living room and make the living room smaller..." (woman).*

*"We do not have a place to hang [wet clothes]... So, especially in winter, we have to be aware of the bedroom ... you should see how cold this gets because of the humidity..." (man)*

## Intervened dwellings

*"Yes..., now... It makes you want to ... fix the house, paint it ... uh ... do things to it that you couldn't do before." (woman)*

*"And that one ... as he came home from work, he took off my shoes and went to my room. Now I can't. Now I spend more here [living]" (woman).*

*"And then the driver says to me," Hey, and you, over there, where do you live? "- No, I live in the beautiful ones [...] "I come in the part where the extensions are" (Neighbor)*



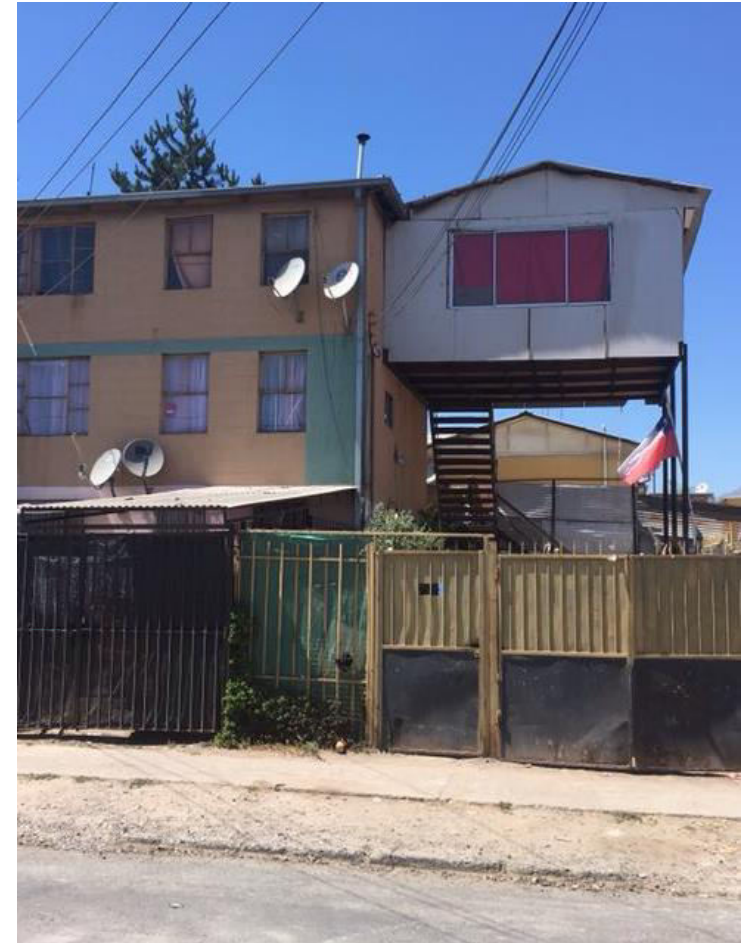
# Final remarks

## Challenging intervention

- Coordination of institutional actors
- Coordination with community
- External factors: “estallido social”, COVID19 lockdowns, political timing

## Challenging study

- High mobility (losses to follow up)
- Intervention delays (flexible study design)
- Limitations to observe long term effects
- COVID19 impact of health and related behaviours



# Final remarks

## Scientific contribution from LAC

Housing effects on health

Urban renovation and health and wellbeing

## Advancing research:

Unwanted effects

COVID19 impact

Recreational areas renovation

Community intervention effects

## Relevance:

Health, wellbeing, childhood, dignity

## Potential population health impact:

172 villas

**76.580 in critical condition** (MINVU. Vivienda Social en Copropiedad. Santiago de Chile: Catastro Nacional de Condominios Sociales; 2014)



## STUDY PROTOCOL

## Open Access

# The *Regeneración Urbana, Calidad de Vida y Salud* - RUCAS project: a Chilean multi-methods study to evaluate the impact of urban regeneration on resident health and wellbeing



Fernando Baeza<sup>1,2</sup>, Alejandra Vives Vergara<sup>1,3\*</sup>, Francisca González<sup>1</sup>, Laura Orlando<sup>1</sup>, Roxana Valdebenito<sup>1</sup>, Andrea Cortinez-O’Ryan<sup>1,4</sup>, Claire Slesinski<sup>5</sup> and Ana V. Diez Roux<sup>5</sup>





**¡thank you!**  
**WWW.ESTUDIORUCAS.CL**



Ignacio Díaz  
Francisca González  
Roxana Valdebenito  
Alejandra Vives  
Laura Orlando  
Natalia Valdebenito  
Pablo Campos  
Fernando Baeza



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