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## Flexibility and the Inpatient Room:

How positive distraction, social support and perceived control reduce stress

# The project



## “Hospital Rooms and Patients’ Well-being: Exploring Modeling Variables”

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# Outline of presentation



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Portugal

- Background
- Research design and sites
- Results
- Discussion and future work
- Practical implications



# Learning Objectives

- Explain the concepts in Ulrich's theory of supportive design
- Identify positive and negative qualities of inpatient rooms identified in the research
- List cross-cultural differences in patients' perceptions of these qualities
- Explain concept of linking (mediating) variable and its relevance to health care design



# Background

- Inpatient rooms as stressors (e.g., Tanja-Dijkstra, 2011)
  - inundated by technology
  - loss of privacy
  - loss of control
  - lack of social support



# Approaches to dealing with stressors

- Patient-centered care
  - active involvement of families/caregivers
  - patients as partners in their care
  - patients' values, preferences considered
- Planetree model as practical example  
(Martin, Hunt, Hughes-Stone, & Conrad, 1990; Stone, 2008)



# What we do and don't know

- The physical environment contributes to well-being and stress
- We don't know how or why
- Most research has concentrated on specific room elements (e.g., art; view to nature)



# We propose a different approach

- Concentrates on psychological processes
- What people think about links elements in room
  - e.g., control of TV;
  - seating for friends;
  - something attractive to look at

to satisfaction and reduction in stress

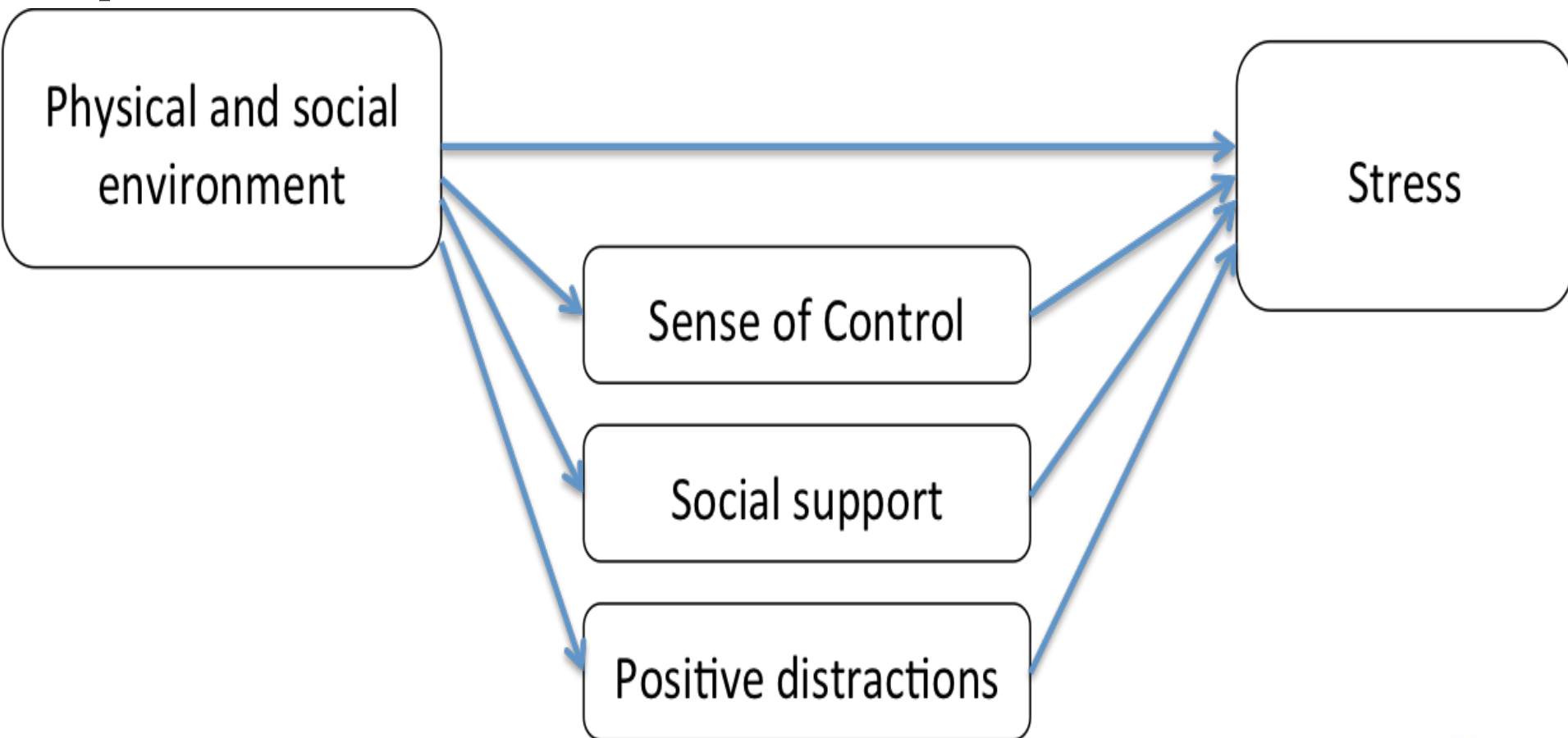


# For intervention

- If we better understand what patients need, it may be easier to decide what elements should be provided in the room



# Ulrich's theory of supportive design provides a model for us to test



Adaption of Ulrich's theory of supportive design (1991)



# Perceived control

- Perceptions of control (perceived control; PC)
- Opportunities to modify, alter aspects of environment (Lee & Brand, 2005)
- Major loss of this control in hospital settings (Huisman, Morales, Van Hoof, & Kort, 2012)

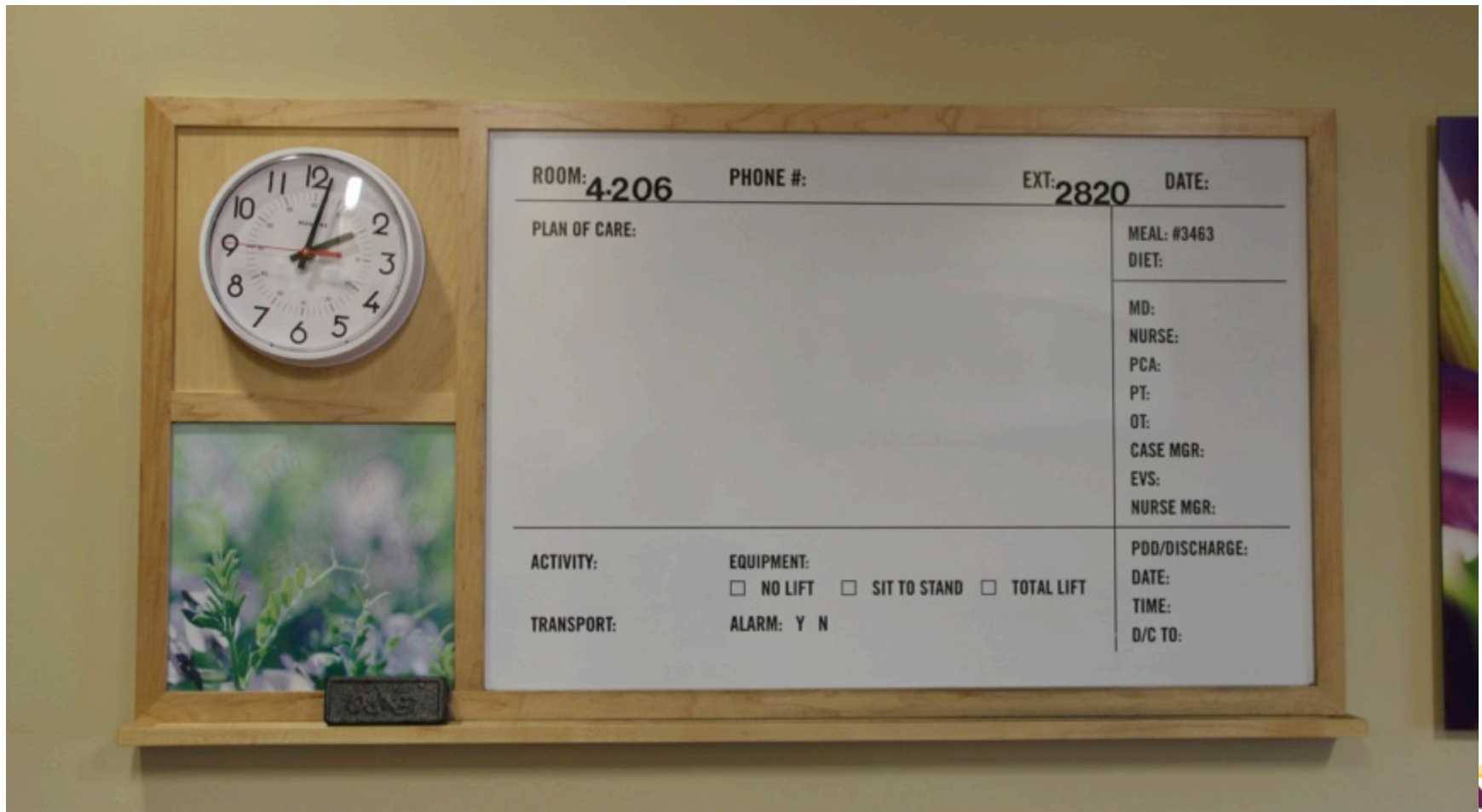


# Perceived control

- Patients need self supporting systems—opportunities for control
  - Position of bed
  - Amount of natural light
  - Information about healthcare status
  - Entertainment (Internet, television, music)



# Whiteboard provides control



A whiteboard with a wooden frame is mounted on a wall. To the left of the whiteboard is a round analog clock showing approximately 1:50. Below the clock is a small photo of purple flowers. The whiteboard itself is divided into sections for patient information and care plans.

ROOM: 4-206	PHONE #:	EXT: 2820	DATE:
PLAN OF CARE:			MEAL: #3463 DIET:
			MD: NURSE: PCA: PT: OT: CASE MGR: EVS: NURSE MGR:
ACTIVITY:	EQUIPMENT:	PDD/DISCHARGE:	
	<input type="checkbox"/> NO LIFT <input type="checkbox"/> SIT TO STAND <input type="checkbox"/> TOTAL LIFT	DATE:	
TRANSPORT:	ALARM: Y N	TIME:	
		D/C TO:	

# Bed adjustable by patient provides control



# Social support

- Families members/visitors reduce stress
  - (Bolger & Amarel, 2007; Kornblith et al., 2001; Uchino, 2009)
  - Accommodation for presence (Mayo Clinic)



# Seating for visitors



# Positive distraction

- Most heavily researched of Ulrich's model (easiest to implement?)

Malenbaum et al., 2008; Ulrich & Gilpin, 2003)

Art on wall, reading material, fish tank

Representational scenes of nature (Eisen et al., 2008, Hathorn & Nanda, 2008; Mazer, 2010)





# Model not verified experimentally in field settings

- Andrade & Devlin (2015)
  - Verified in laboratory setting with hypothetical situation
- Number of elements in the hospital room affects expected stress through perceptions of how much **PD** and **SS** room is perceived to provide, but NOT through perception of level of **PC** available.



# This project: Field settings in hospitals

- 1 hospital in US (2 units)
- 3 hospitals in Portugal
- all orthopedic units



# US Hospital Connecticut 252 beds

- One unrenovated unit (24 single rooms)
- One renovated unit (22 singles, 4 doubles)
- Only singles in study



# Old Unit (US)





# New Unit



# Inboard toilet and shower room



# Shower



# linen closet





# Hospital da Luz (Portugal)

- opened in 2006
- largest private hospital in Portugal
- 168 rooms
- data were collected on two surgery units
- 3 large suites (size: 399.9 sq. ft.)
- 25 singles
- 35 double rooms (both 263.1 sq. ft.)



# Single room (viewed from hallway)









# Toilet room and shower



# shower



# Double room



# Shared toilet/shower room for double



# Shared shower double



# suite







# Hospital dos SAMS (Portugal)

- The Hospital dos SAMS in Lisbon
- opened in 1994
- dedicated to serve individuals who are bank employees, including current or retired employees and their families
- 121 inpatient beds.



- 13 single rooms (between 156.1 sq. ft. and 239.0 sq. ft.)
- 5 double rooms (size: between 241.1 sq. ft. and 274.5 sq. ft.)
- 1 triple room (324.0 sq. ft.)
- single rooms had a private toilet and shower room
- the doubles and the triple had a shared private toilet and shower room



# SAMS: Single room



# SAMS: single room toilet & shower

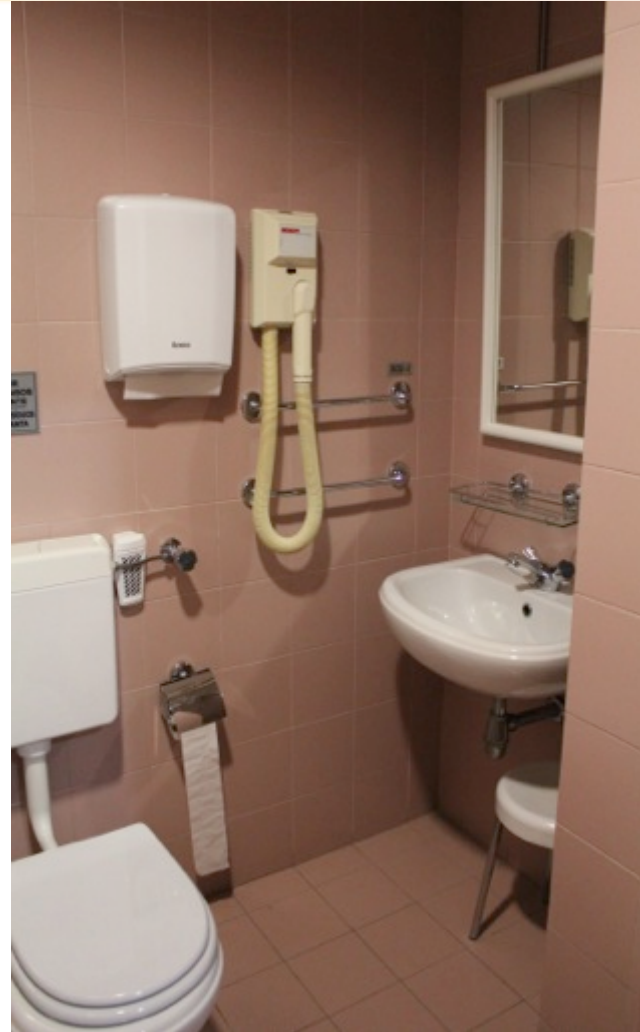




# SAMS: double room



# SAMS: Shared toilet & shower room



# Hospital Curry Cabral (HCC;Portugal)

- Opened 1998
- public
- ~500 inpatient beds
- Research rooms:
- 8 singles (between 160.4- 241.1 sq. ft.)
- 1 double (159.3 sq. ft.)
- 1 triple rooms(385.3 sq. ft.).





# HCC

- single rooms:
  - 7 w/private toilet and shower room
  - 1 had no private toilet room
- double had no private toilet and shower room
- triple had a shared private toilet and shower room



# HCC: single



# HCC: toilet room & shower



# HCC: view



# HCC: double bed room



# HCC: triple bed room





# Observation checklist: Elements

## Perceived Control

- Closet for belongings
- Lighting adj. by patient
- Whiteboard for status
- Bedside table
- Call button
- TV adj. by patient
- Additional table
- Clock
- Room service menu
- Private toilet
- Temperature adj. by patient

## Social Support

- Room type (suite, single, double)
- chairs for visitors
- Internet (Wi-Fi)
- Bench to sit/sleep
- Bedside phone
- chair for patient

## Positive Distraction

- Television
- Prints/posters of nature/landscapes
- View to nature
- space to put photos
- closet to screen laundry
- window is large (whole wall)



# Mean # elements by hospital

	PC (0-11)	SS (0-6)	PD (0-6.5)
L&M Old	10.75	5.00	3.66
L&M New	10.00	6.00	6.35
HCC	4.46	2.60	2.06
SAMS	8.23	5.73	3.76
LUZ	8.12	5.67	3.15

# Survey for patients: 4 sections

- Expectations before hospitalization
- Feelings at time of survey, incl. stress and PC, SS, SD
- Overall evaluations of hospitalization
- Background information



# Stress

- Spielberger 20 item State-trait Anxiety Inventory (STAI)
- “I am tense”
- 1=not at all to 4=very much so



# PC (5), SS (4), PD (4)

“Please tell us what you think about the features of your hospital room.”

Adapted from other scales

21 items; 8 removed from CFA leaving 13  
mixed presentation

1=strongly disagree to 5=strongly agree



# Perceived Control

1. In this hospital room, I am able to control my environment.
3. I can personalize my hospital room. (\*)
4. Health care providers have complete control over my hospital room during my hospitalization. (\*)
7. I can control the physical features of my hospital room.
11. There are choices I can make about the physical features of my hospital room.
15. In this room I can adjust, re-arrange, and re-organize things as needed.
21. I determine the organization/appearance of my hospital room.



# Social support

- 2. In this hospital room there are possibilities to keep in contact with close others. (\*)
- 5. This hospital room allows me to interact with visiting family and friends.  
9. This hospital room provides good opportunities for engaging in social activities. (\*)
- 12. My family and friends can feel comfortable in this hospital room.
- 17. In this hospital room I can enjoy the company of visiting family and friends.  
20. This hospital room provides a supportive environment for visiting family and friends.



# Positive distraction

- 6. In this room my attention is drawn to interesting things.
- 8. There is much to explore and discover in this room. (\*)
- 10. In this room I can spend time looking at the surroundings. (\*)
- 13. In this room there are objects that attract my attention.
- 14. In this room I am absorbed by the surroundings.
- 16. There is plenty that I want to keep looking at here.
- 18. In this room time passes quickly. (\*)
- 19. Being in this room helps ease the experience of being sick in the hospital. (\*)





# Satisfaction

- How satisfied in general w/ exper. (1-9)
- To what extent unit met expectations (1-9)
- To what extent unit met needs (1-9)
- How far unit was from perfect care unit (0=very distant to 10=very close)



# Demographic Section

- age
- gender
- race/ethnicity
- estimate of family income
- highest level of education
- number of times hospitalized overnight
- whether hospitalized at that particular hospital previously



# Health status data

- measures of self-reported pain (from 0 to 10)
- blood pressure and heart rate used to monitor patients
- the amount of daily medication for pain that patients took during hospitalization



# Patients

- 236
  - 78 US (23 old unit; 55 new unit)
  - 158 Portuguese
    - HCC (old public) 34
    - SAMS (older private) 56
    - da Luz (newer private) 68



# Patients

- US:
  - 64.4 years
  - 55.1% women
  - 53.8% some college or college degree
- Portugal
  - 56.3 years
  - 60.1% women
  - 25.0% some college or college degree



# Room assignments

- US: all in single rooms
- Portugal:
  - HCC: 18 singles, 10 doubles, 6 triple
  - SAMS: 25 singles, 23 doubles, 8 triple
  - da Luz: 18 singles, 50 doubles





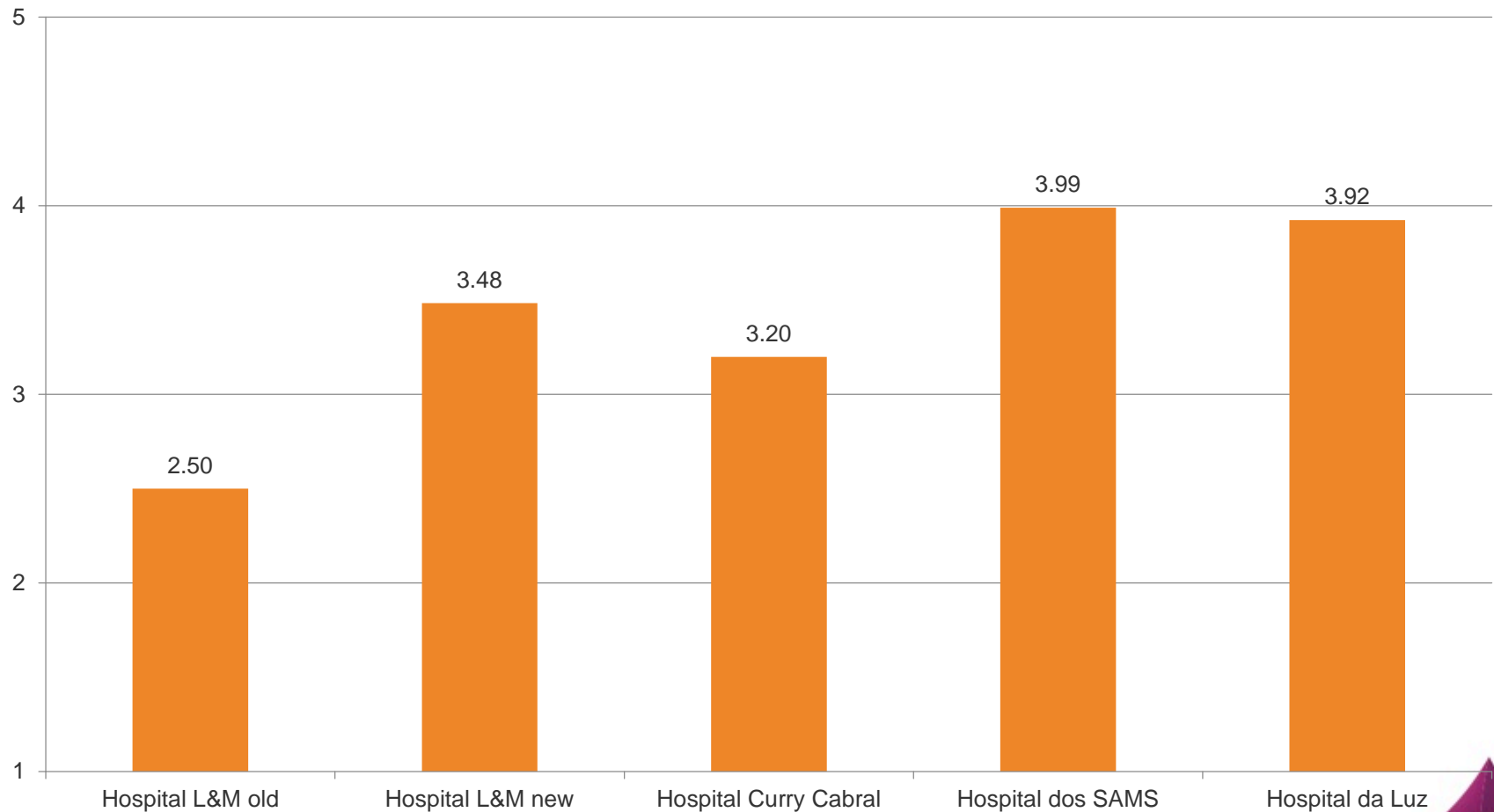
# Data collection

- All surveys delivered after at least 1 day on unit
- Informed consent
- Most preferred to be interviewed
- US health data from IT records
- Portugal-nurses printed out medical data on day of interview



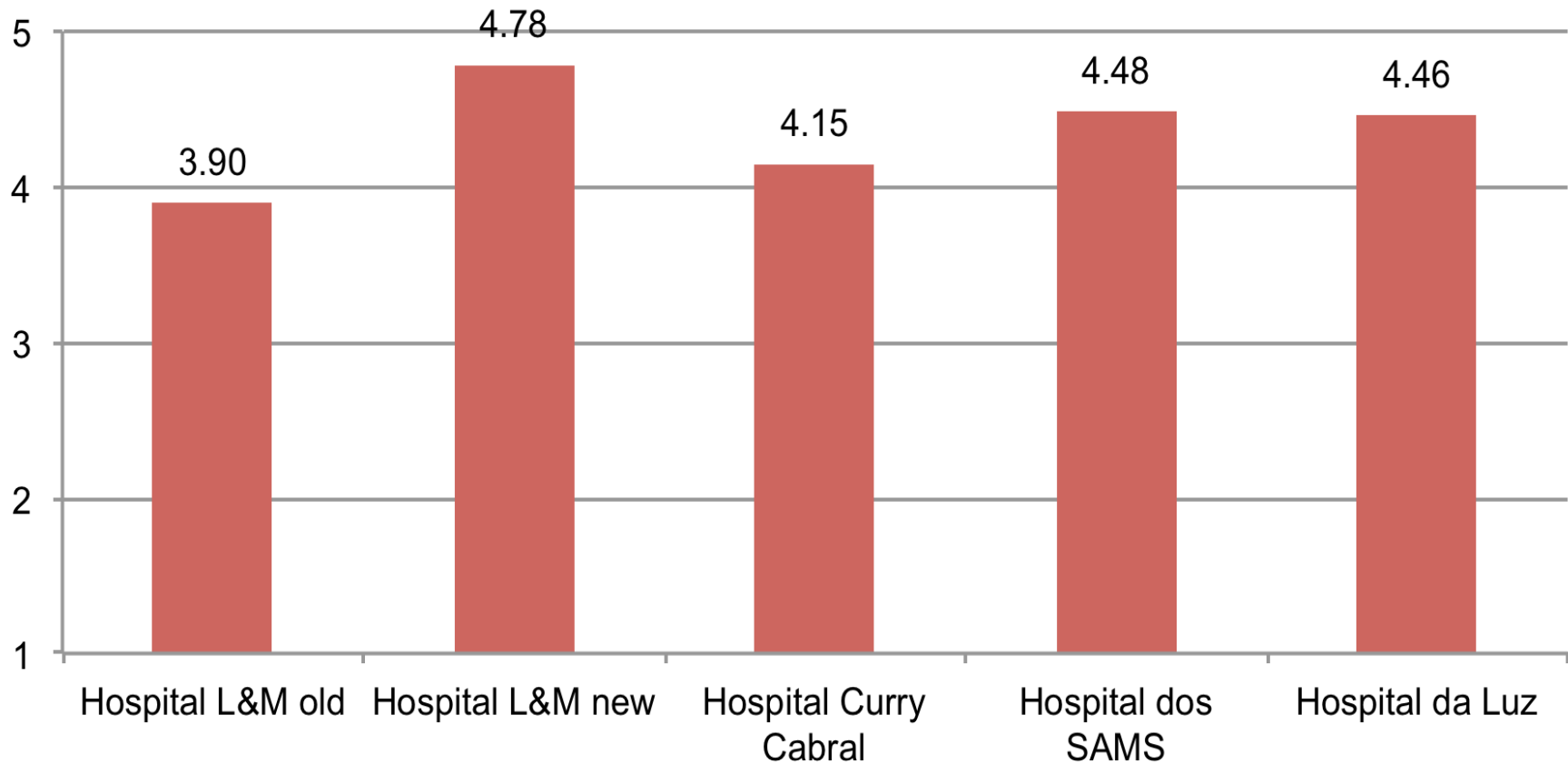
# PC: Mean level by hospital

1 = low 5=high level of control



# SS: Mean level by hospital

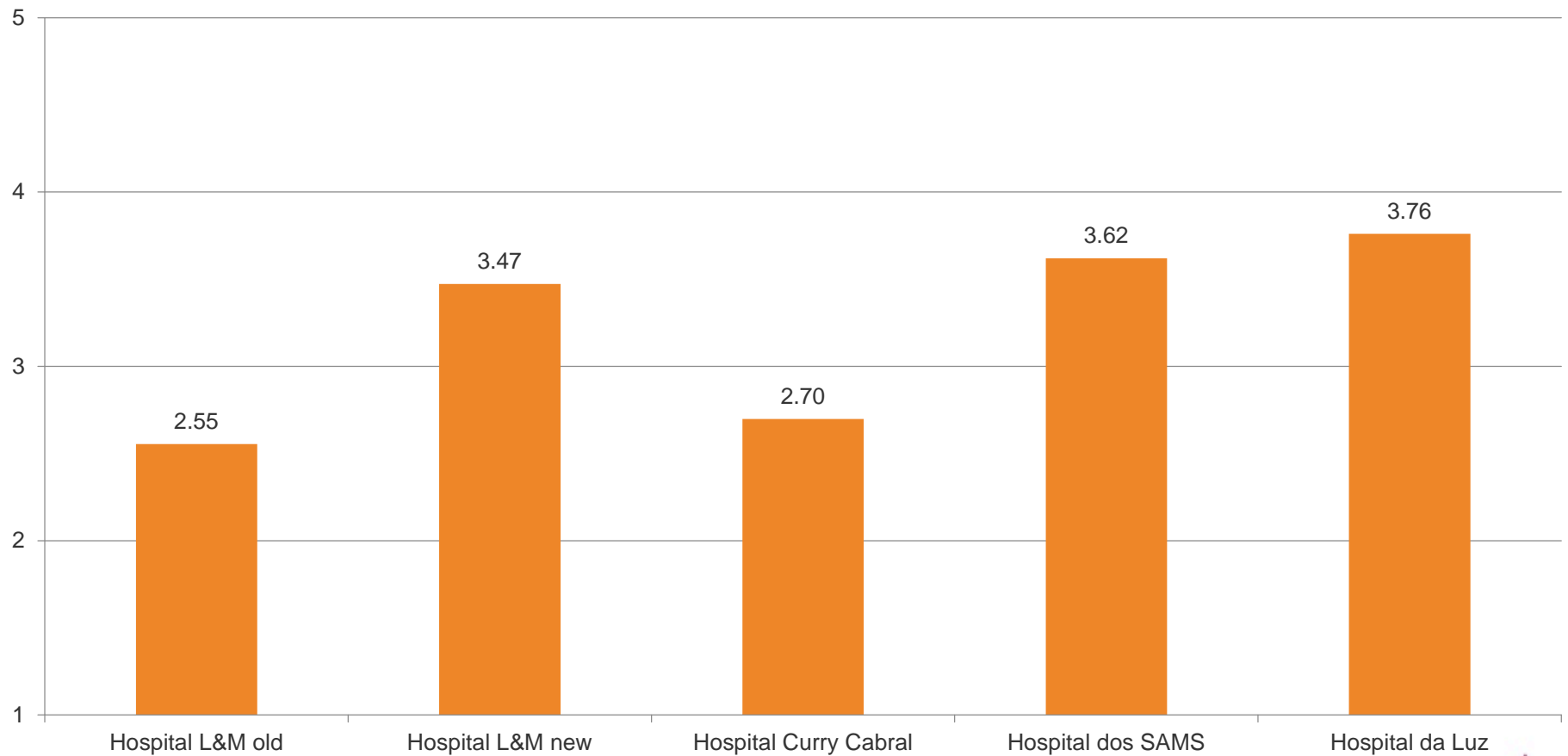
1=low to 5=high level of social support





# PD: Mean level by hospital

1=low to 5=high level of positive distraction



# Summary

- In patients' views, SS > PC or PD
- Old unit US similar to old public (HCC) Portugal
  - Even though Old US has more favorable elements than HCC
  - Likely the physical condition of the elements and not just their number matters



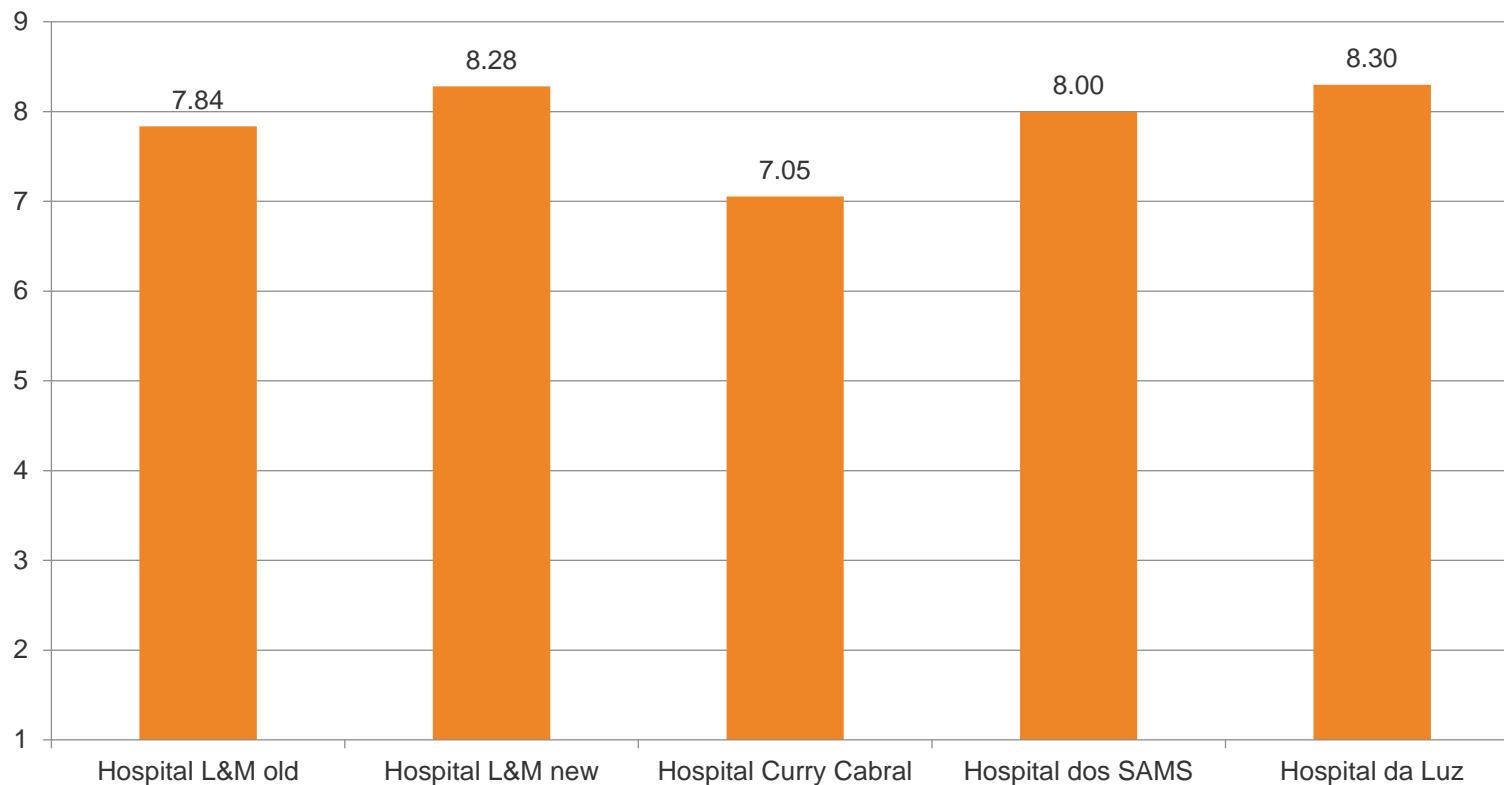


# Correlations between # elements and PC, SS, and PD ratings

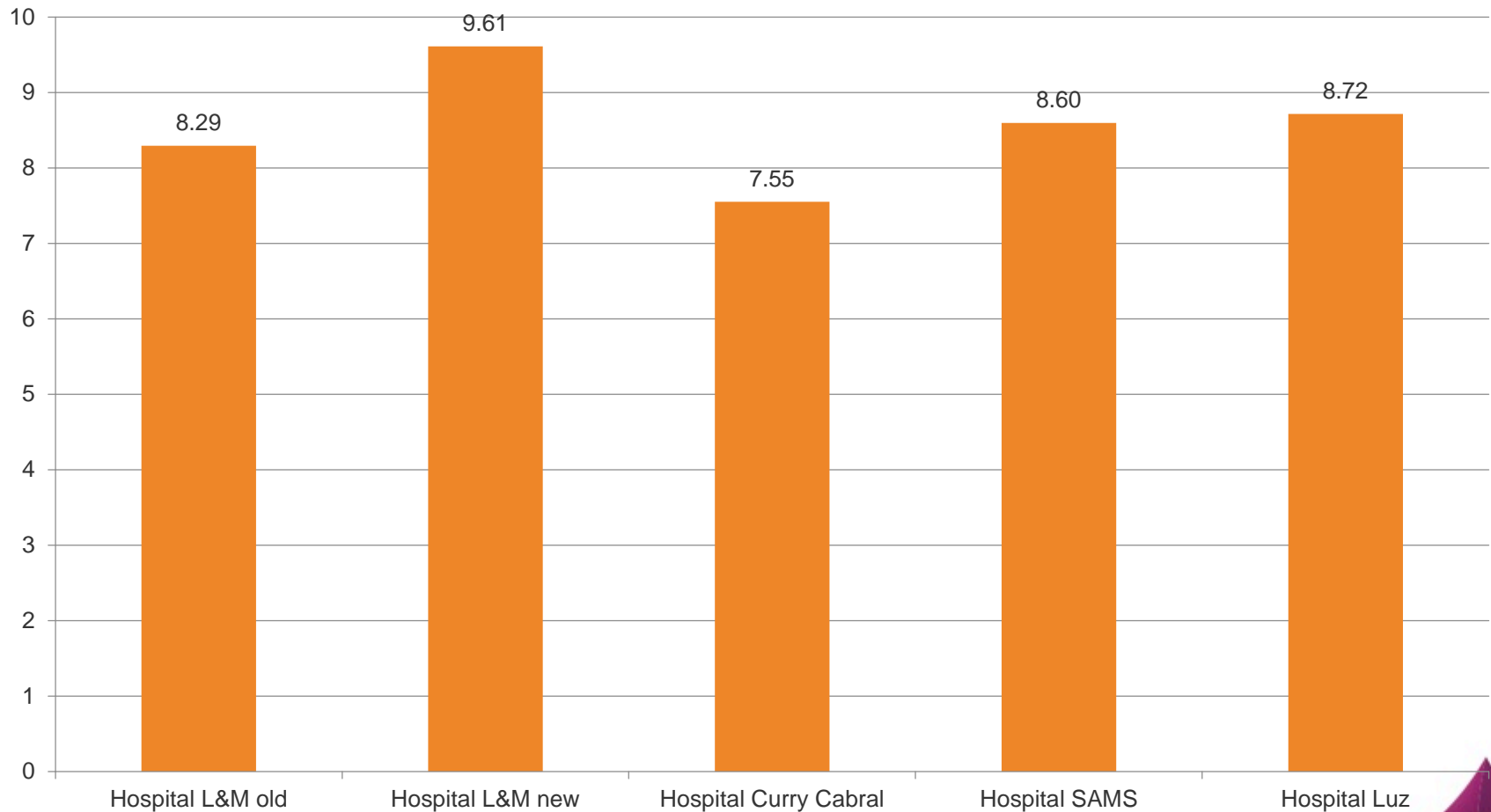
- SS and # elements  $r = .24, p < .01$
- PC and # elements  $r = -.20, p < .05$   
(opposite direction)
- PD and # elements  $r = .03, ns$



# Expectations

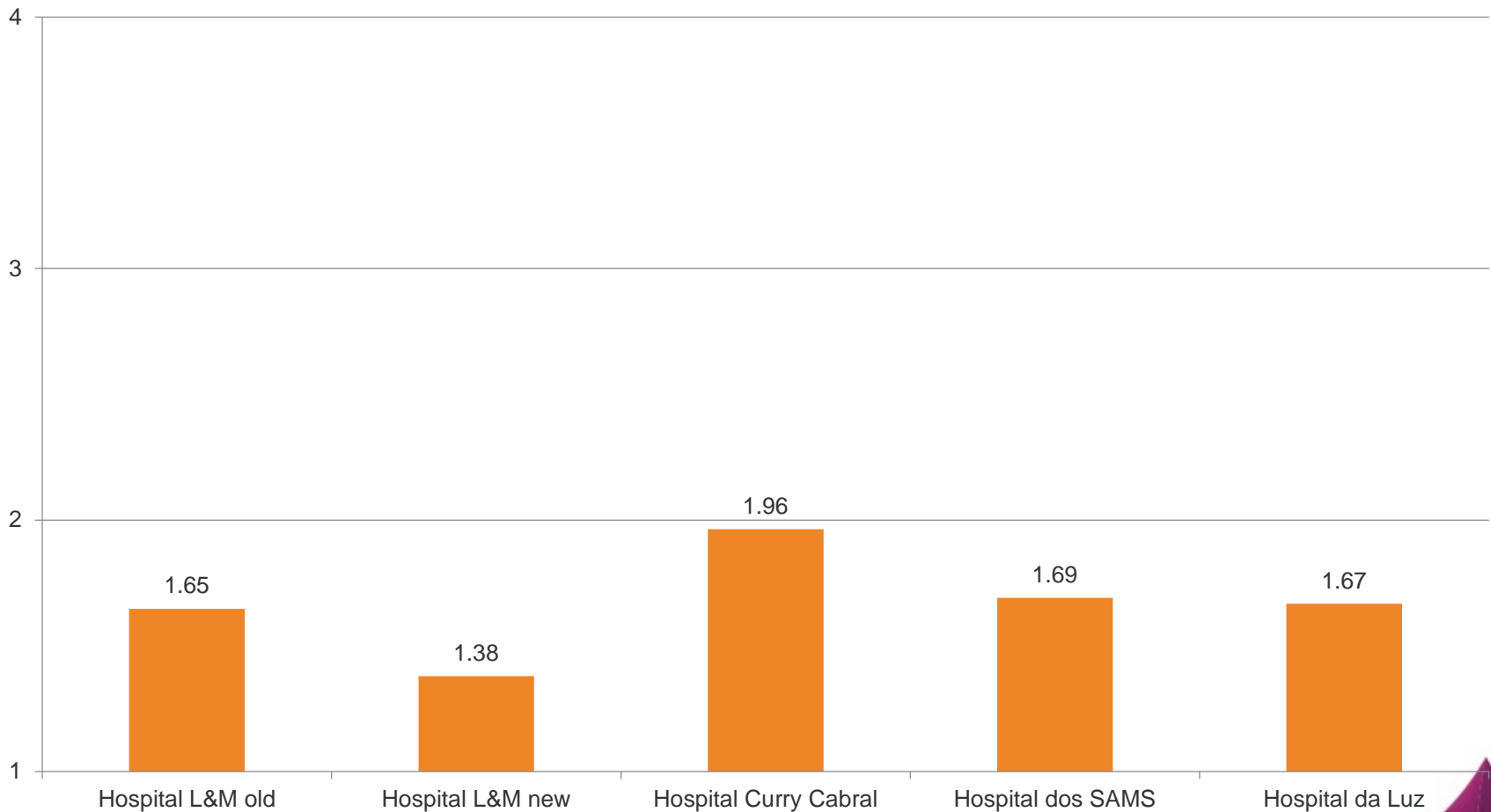


# Overall level of satisfaction



# Anxiety

1 = not at all 4 = very much so



# Correlations

- more favorable elements correlates w/ -  
greater perceptions of:
  - social support
  - perceived control
  - positive distraction provided by the room
  - greater satisfaction with the service
  - greater intention to choose the room again
  - lower stress



# Mediational analyses

- What is a mediational analysis?

“A mediating variable transmits the effect of an independent variable on a dependent variable” (MacKinnon, Fairchild, & Fritz, 2010)

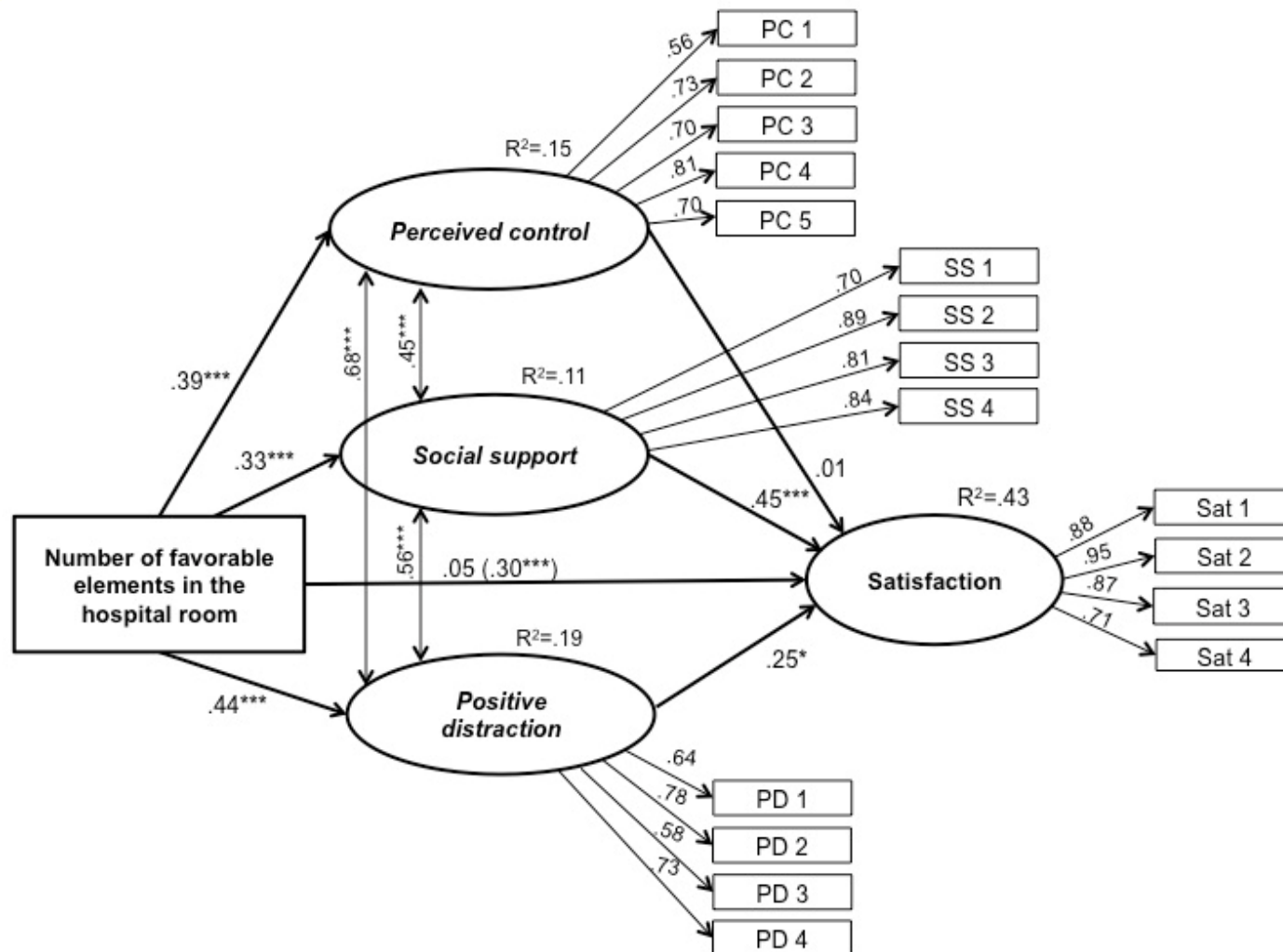


# What does this mean for our study??

- we have rooms elements (#s of PC, SS, PDs) as IVs
  - we have stress, satisfaction ratings, health status data as DVs
  - we want to know if *perceptions* of PC, SS, PD carry the effect of the IVs to the DVs
- In other words, does it matter what people are *thinking* about PC, SS, PD that carries the effect of the elements to outcomes like stress????



# The figures are %!@#



# Important findings: Overall satisfaction

- Social support and positive distraction carry the effect (are mediators)
- Perceived control is not



# Important findings: By country

- For US: social support and perceived control mediate satisfaction ratings
- For Portugal: social support and positive distraction mediate satisfaction ratings



# Important findings: Stress

- Positive distraction and social support mediate stress (the higher ratings of these, the lower the stress)
- But perceived control does not



# Important findings: Stress by country

- US: perceived control and social support mediate this
- Portugal: the only mediator is positive distraction



# Health Status Data

- Few differences
- Lack of confidence in these data
- No differences by country in
  - average pulse during hospitalization
    - Between either US unit
    - Among the 3 Portuguese units



# Blood Pressure: Diastolic

- No differences between average diastolic BP US vs. Portugal
- US patients in old unit had higher DPB than those in new unit ( $p < .001$ )
- In Portugal, no differences across the 3 units



# Blood pressure: Systolic

- No differences US vs. Portugal in average systolic blood pressure (SBP) during hospitalization
- No differences US old vs. new unit
- No differences Portugal across 3 units



# Pain ratings

- US patients reported more pain (3.87) vs. Portuguese patients (0.74) on scale where 0=absence of pain to 10=strongest pain

US: no sign. difference bet. units

Portugal: da Luz sign. less than SAMS and HCC



# Mediation analyses

- Analyses suggest that effect of room elements on BP is **not mediated** by SS, PC, and PD



# Results summary thus far

- # room elements has positive effect on patients' well-being
- # favorable elements improve satisfaction
- That perceptions involved (mediate) this process



# WHICH elements may be involved?

- Qualitative comments
- Patients asked to list in rank order 3 room elements that influenced level of satisfaction with hospital experience
- We categorized into SS, PC, and PD



# Number of comments

- US: sign. more + than - comments about new than old unit
- Portugal: sign. more + than – comments about

da Luz vs. HCC, and SAMS vs. HCC but not da Luz vs. SAMS



# Themes

- Most comments about PC (248)
  - Esp. functionality (whether something works)
- Followed by positive distraction (201)
  - Esp. view to outside and entertainment
- Then social support (138)
  - Esp. benefits of private room



# US

- Perceived control
  - Whiteboard (old vs. new)
    - Same idea, but different legibility
  - “great to have patient information”



# Whiteboard: old vs. new

Room: <u>4.129</u>		Phone: 860-442-0711 EX. <u>2885</u>	
Date:		Anticipated Discharge Date:	
Nurse:		PCA/Aide:	
MD/PA/APRN:		Case Manager:	
<b>Mobility Level: "I have been..."</b> <input type="checkbox"/> OOB to Chair <input type="checkbox"/> OOB to Bathroom <input type="checkbox"/> Walked in hallway <input type="checkbox"/> On bed rest: Reason: _____ <b>Assistance Level: "I require..."</b> <input type="checkbox"/> Assist of 1 <input type="checkbox"/> Assist of 2 <input type="checkbox"/> None, can be OOB on my own <b>Assistive Device: "I use..."</b> <input type="checkbox"/> Walker <input type="checkbox"/> Crutches <input type="checkbox"/> Cane <input type="checkbox"/> No device <b>Safe Patient Handling Needs:</b> <input type="checkbox"/> Gait belt <input type="checkbox"/> Sit to stand lift <input type="checkbox"/> Total lift <input type="checkbox"/> No lift <input type="checkbox"/> Repositioning sheet	<b>Anticipated Discharge Plan:</b> <input type="checkbox"/> Home, with services <input type="checkbox"/> Home, no services needed <input type="checkbox"/> Rehab <input type="checkbox"/> Skilled Nursing Facility <b>Personal Care with:</b> <input type="checkbox"/> Nursing <input type="checkbox"/> Self <b>Diet:</b> Meal #: 3463 <input type="checkbox"/> Type: _____ <input type="checkbox"/> Nothing to eat or drink Start : _____ Reason: _____ <b>No BP or Venipuncture:</b> <input type="checkbox"/> LUE <input type="checkbox"/> RUE <input type="checkbox"/> N/A <b>Take BP On:</b> <input type="checkbox"/> LUE <input type="checkbox"/> RUE <input type="checkbox"/> Either	<b>Vital Signs:</b> BP: _____ HR: _____ SaO2: _____ Temp: _____ PG: _____ <b>Plan of Care:</b> _____ _____ _____	

Room: <u>4206</u>		Phone #: _____		EXT: <u>2820</u>		DATE: _____	
PLAN OF CARE:				MEAL: #3463 DIET:			
				MD: NURSE: PCA: PT: OT: CASE MGR: EVS: NURSE MGR:			
ACTIVITY:		EQUIPMENT:		POB/DISCHARGE:			
		<input type="checkbox"/> NO LIFT <input type="checkbox"/> SIT TO STAND <input type="checkbox"/> TOTAL LIFT		DATE:			
TRANSPORT:		ALARM: Y N		TIME:			
				D/C TO:			

# Functionality of toilet & shower room

- Old:
  - neg. lack of shower in old unit
- New:
  - neg. need more than a shower curtain
  - More concave drainage area
  - Lip into toilet room a problem



# Old toilet room



# New toilet and shower room



# View can be positive or negative



# Social support through furniture...but



# Hospital da Luz

- Positive distraction is the central theme
  - Television (entertainment console)
  - Natural light (literally hospital of light)



- (add photo)



# Social support

- Room size (large single rooms; suites)
- Internet
- Relatively few negative comments overall



- (add photo)



# Hospital dos SAMS

- Perceived control (hygiene, cleanliness)
- Positive distraction (window, view) Natural light specifically mentioned
- Negative comments spread across PC, PD, SS



- (add photo)



# Hospital Curry Cabral (HCC)

- Different picture—negative, esp. positive distraction (lack of TV)
- If TV, donated by previous patient (but usually lack of remote control)
- Perceived control: + if water closet;
  - without
- Few comments about SS



- (add photo)



# Discussion

- Why does the hospital physical environment matter?
- Because people think about it
- Specifically, perceptions of PC, SS, and PD affect their satisfaction and stress



- If we better understand how the elements influence perception, we will make better decisions about which elements to provide



# What we showed

- 1) more favorable elements in the room lead to greater perceptions of SS, PC, and PD
- 2) more favorable elements in the room, greater the satisfaction with hospital experience, and the lower the stress



- 3) the 3 psychological constructs (SS, PC, and PD) mediate relationship between the elements and well being
  - For satisfaction with hospital experience
  - For Stress
  - Not for blood pressure levels

**We confirmed Ulrich's model in a field setting**



# Cultural Differences

- Social support:
  - US: predicts satisfaction and stress
  - Portugal: predicts satisfaction
- Perceived control:
  - US: predicts satisfaction and stress
- Positive distraction:
  - Portugal: predicts satisfaction and stress



# Why is PC more important in US and PD more important in Portugal?

- Locus of control?
- Individualistic vs. collectivistic cultures?
- Traditions of healthcare in the 2 countries
  - Biopsychosocial in US (more active)
  - Biomedical in Portugal (more passive)



- Clear example is whiteboard in US



- Importance of windows and natural light in Portuguese sample



# Practice recommendations

- Increase number of favorable room elements
- Consider role of culture
- Make sure equipment works
- Continue work on PC because we need better measures



# Other Lessons learned

- Importance of site champion
- Difficulty with health status data



# Flexibility and the Inpatient Room:

How positive distraction, social support and perceived control reduce stress



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