INFLUENCE OF OUTDOOR TEMPERATURES INDOOR AND OCCUPANTS' HEALTH IN RESIDENTIAL HOUSES IN VIETNAM

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1 INTRODUCTION

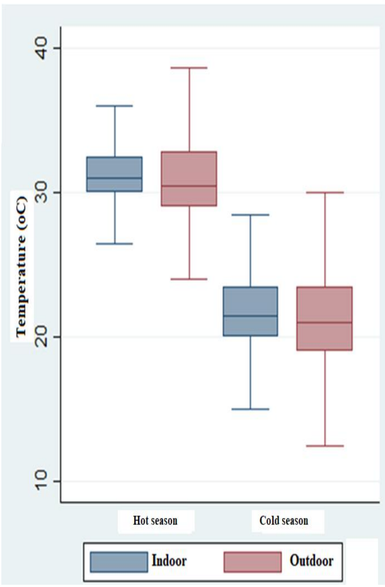
- Indoor and outdoor temperature not only directly affect building electricity energy consumption but also negatively effect on occupants' health.
- However, a few studies have been conducted to quantify the relationship between indoor and outdoor temperature in Vietnam.
- The study aimed to examine how indoor temperature relate to outdoor ambient weather, and the influence of temperature on human health in Vietnam.

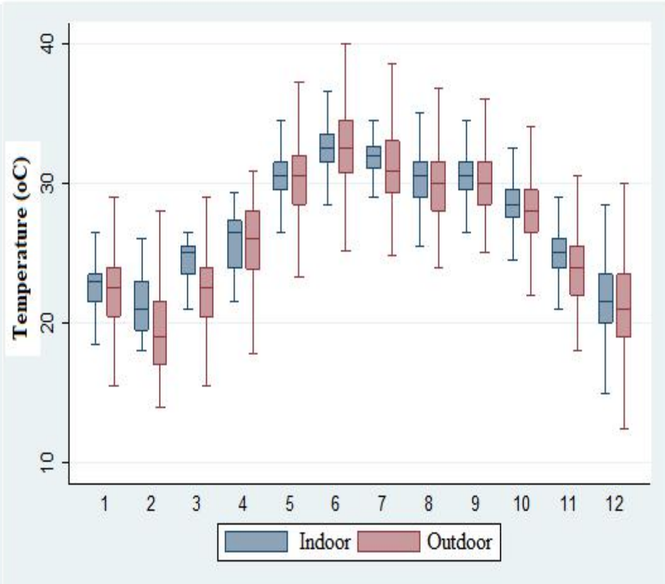
2 METHODS

- The outdoor and indoor temperaturesof 20 residential houses in Hanoi were simultaneously and continuously measured from May 2019 to April 2020 using temperature sensors Maxim Integrated DS1921 Hygrochron iButton to determine their trends.
- A linear regression model was used to quantify the relationship between indoor and outdoor temperatures in hot season (Jun.-Aug.) and cold season (Dec. – Feb.)

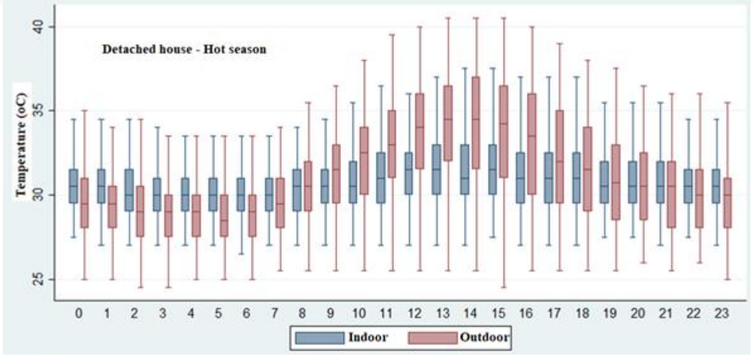
House	Number
Types of house:	
+ Detached house	9
+ Terraced house	11
Outer wall:	
+ Solid brick - 220 mm	3
+ Hollow brick - 220 mm	10
+ Solid brick - 110 mm	7
+ Hollow brick - 110 mm	1
Roof:	
+ Flat roof	10
+ Pitched roof	11
Age of the house:	
+ < 6 years	4
+ 6- 14 years	7
+ >14 years	7
+ missing data	3
Air conditioning	
+ Air conditioning	15
+ No air conditioning	6

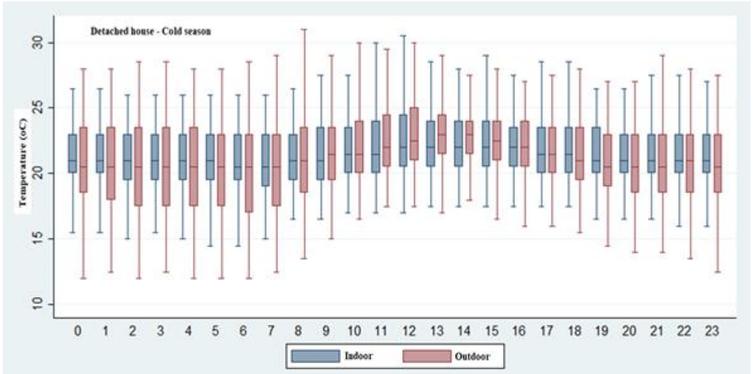
3 RESULTS

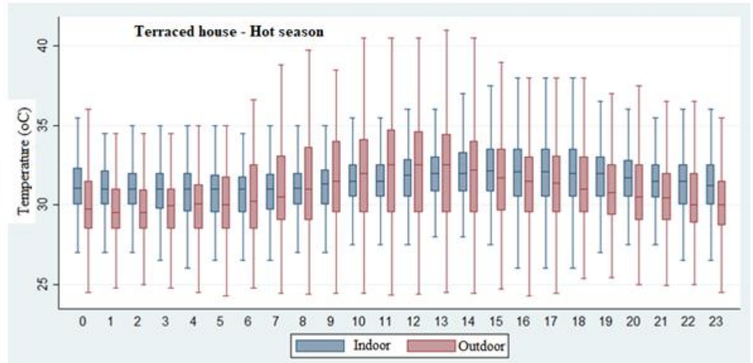


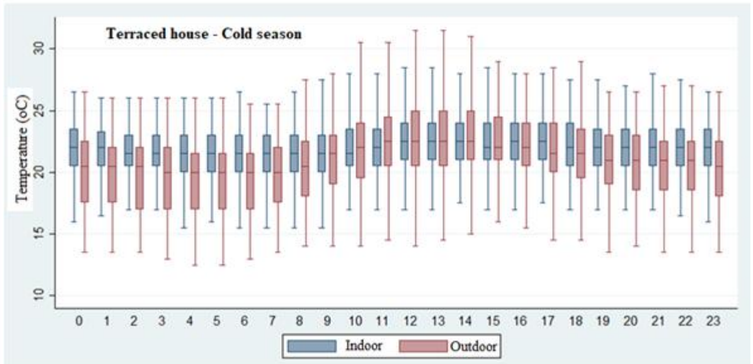


Indoor and Outdoor temperature in hot, cold seasons and year-round

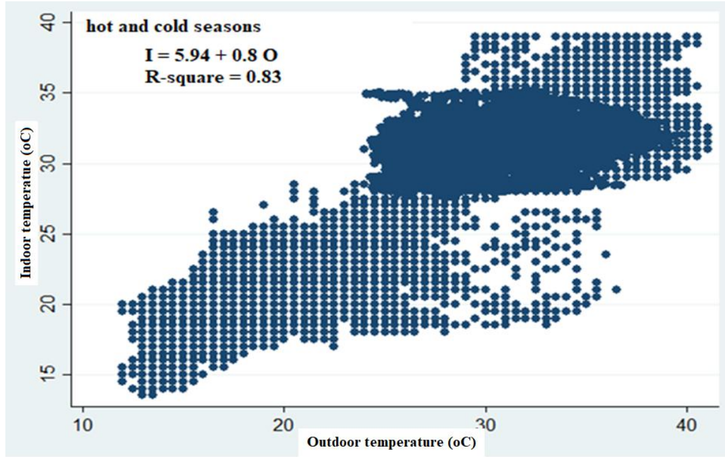




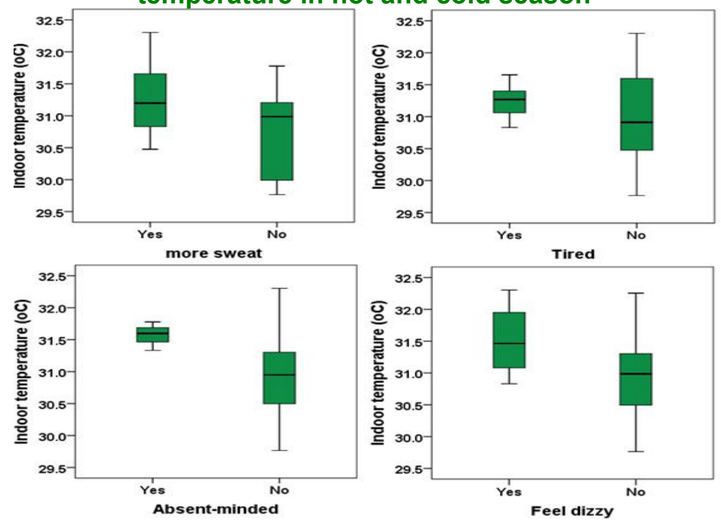




Temperatures over 24 hours period



Relationship between indoor (I) and outdoor (O) temperature in hot and cold season



Indoor temperatures and some health problems

4 Conclusion

- This is the ever first study in Vietnam investigating the relationship between indoor and outdoor temperature.
- Annual mean indoor and outdoor temperatures were 28.5±3.9°C and 28.0±4.6°C, respectively; while mean indoor and outdoor temperatures in the hot season were 31.2 ±1.9°C and 30.9±2.9°C, respectively, and in the cold season were 21.8 ± 2.3°C and 21.1 ± 3.3°C.
- High summer indoor temperatures have influenced occupants' health. Most of them felt more sweat, tired and some felt dizzy and absent-minded during the hot temperature days.