



PROGRAMA DE PÓS-GRADUAÇÃO EM CIÊNCIAS CARDIOVASCULARES (PPGCardio)

This test measures your ability to comprehend written materials.

TIME: 70 minutes

DIRECTIONS:

Read the passage carefully and, for each question, choose the one best answer (A, B, C or D) based on what is stated in the passage or on what can be inferred from the passage. Then mark the letter on your answer sheet that matches the letter of the answer that you have selected.

Integrating Public Health Into House Design

By Nelli Westercamp & John E. Gimnig

1. Across sub-Saharan Africa, malaria, diarrheal diseases and acute respiratory infections (ARI) remain the leading causes of childhood illness and death despite advances in drugs, vaccines and vector control. These diseases are strongly shaped by environmental conditions, particularly housing. Mshamu et al. report a cluster-randomized trial in Tanzania showing that improved housing can simultaneously reduce multiple childhood diseases while enhancing comfort through passive cooling and energy autonomy.
2. Over three years, children living in “Star Homes” — designed to improve vector control, ventilation, sanitation and hygiene — experienced a 44% reduction in malaria, a 30% reduction in diarrheal diseases and an 18% reduction in ARI compared with children in traditional homes with mud walls, thatched roofs and earth floors. Children under five also showed improved linear growth, suggesting benefits beyond infection control. Unlike conventional public health measures that target single diseases or transmission routes, the Star Home model addressed the home as an intersection of interacting exposures by reducing mosquito entry, indoor smoke and environmental contamination while improving ventilation and sanitation.
3. Housing has long been recognized as a determinant of health and, in malaria control, as a neglected but important intervention. Measures such as screened windows, sealed wall gaps and raised sleeping areas can reduce mosquito entry. Improved housing contributed historically to malaria decline in the USA and Europe, and studies in sub-Saharan Africa have documented similar protective effects.
4. The benefits of improved housing extend beyond malaria. Safe water, sanitation and handwashing facilities reduce diarrheal disease, while improved flooring lowers the risk of enteric and parasitic infections. Housing structure also affects indoor air quality because ventilation and building materials influence exposure to particulate matter. Although many rural households in Tanzania cook outdoors, the reduction in ARIs observed in the study suggests that smoke exposure inside homes still occurs and can be mitigated through better design. Housing improvements may also reduce heat stress and other vector-borne diseases not examined in the trial.
5. The study also demonstrates that infrastructure alone is insufficient. Early acceptance of the new homes was hindered by mistrust, rumors and community tensions, improving only after sustained engagement with residents. These findings highlight that housing is not simply a physical structure but a socially and culturally embedded space associated with security, identity and ancestral ties. Research in Uganda similarly shows that responses to housing interventions are shaped by land ownership, cultural practices and the social meaning of homes. Structural interventions therefore need to be co-developed with communities and adapted to local contexts, since success depends as much on acceptability and use as on technical design.
6. The economic implications are also important. Star Homes required an upfront investment of about US\$8,800 per house but were designed to last around fifty years with relatively low maintenance. Such durability may generate long-term returns through lower healthcare costs, improved productivity and better child development. However, these approaches mainly apply to new construction and do little to address the large stock of existing homes where most families will continue to live.

7. Lower-cost retrofit interventions provide a complementary strategy. Trials in Uganda and Côte d'Ivoire have shown that measures such as house screening and eave tubes can provide durable protection at far lower cost. Yet even these cheaper interventions may remain financially inaccessible for many households. Policymakers must therefore balance investments in new health-optimized housing against upgrading existing homes, as well as one-time structural interventions against conventional measures such as insecticide-treated nets and indoor residual spraying that require continuous delivery.
8. More broadly, the study encourages a rethinking of disease prevention. While global health has traditionally emphasized vaccines, drugs and insecticides, improving the built environment offers a form of structural prevention capable of providing sustained protection with minimal ongoing input. As Africa faces rapid urbanization and increasing climate-related pressures, integrating public health, architecture and environmental design could reduce disease while improving resilience, energy efficiency and overall well-being. Although the Star Home model is not a definitive solution, it provides important proof of concept for how health-oriented housing design can reduce multiple diseases simultaneously.

Adapted from <https://www.nature.com/articles/s41591-026-04413-7>

1. According to the paragraph 2, what distinguishes the Star Home model from many traditional public health interventions?
 - A) It replaces many traditional disease-prevention measures in affected communities.
 - B) It combines several environmental improvements within one housing design.
 - C) It concentrates mainly on the reduction of mosquito populations outdoors.
 - D) It focuses primarily on improving electricity access in rural regions.
2. According to the passage 2, which benefit of improved housing was observed among children under five?
 - A) Increased resistance to all vector-borne diseases.
 - B) Greater access to formal education opportunities.
 - C) Positive growth response and development outcomes.
 - D) Lower dependence on nutritional supplementation programs.
3. In paragraph 3, why does the author mention the historical decline of malaria in the USA and Europe?
 - A) To provide historical evidence supporting housing-based prevention efforts.
 - B) To describe how migration patterns affected disease transmission rates.
 - C) To contrast earlier prevention methods with modern vaccine programs.
 - D) To explain why housing reforms remain difficult in poorer regions.
4. Which rhetorical function does paragraph 3 mainly serve in the passage?
 - A) It explains practical barriers to improving rural housing systems.
 - B) It presents criticism of earlier malaria-control research methods.
 - C) It discusses demographic changes linked to disease distribution.
 - D) It reinforces housing interventions through historical evidence.
5. The word “*mitigated*” in paragraph 4 is closest in meaning to
 - A) hidden
 - B) expanded
 - C) gathered
 - D) reduced
6. Which of the following can be inferred from paragraph 5 about community attitudes toward housing interventions?
 - A) Residents immediately accepted the Star Homes without hesitation.
 - B) Local residents considered housing less important than medical treatment.
 - C) Social and cultural concerns can strongly influence public health programs.
 - D) Government officials prevented researchers from engaging with communities.

7. Why does the author discuss mistrust, rumors and community tensions in paragraph 5?

- A) To emphasize that social acceptance influences intervention success.
- B) To argue that public health investments should avoid rural regions.
- C) To show that construction methods were technically ineffective.
- D) To suggest that researchers ignored local communities entirely.

8. Which option best expresses the essential information in the highlighted sentence below?

“Structural interventions therefore need to be co-developed with communities and adapted to local contexts, since success depends as much on acceptability and use as on technical design.”

- A) Communities often reject projects created without local participation.
- B) Technical housing designs succeed only when governments enforce them strictly.
- C) Housing interventions are effective only if communities can afford modern materials.
- D) Housing interventions work better when communities participate in creating solutions.

9. The word “*embedded*” in paragraph 5 is closest in meaning to

- A) rooted
- B) attached
- C) isolated
- D) buried

10. According to passage 6, which challenge is associated with Star Homes?

- A) They provide little benefit for child growth and development.
- B) They require yearly reconstruction because of weak materials.
- C) They are mainly suitable for newly constructed housing projects.
- D) They increase dependence on conventional disease-control methods.

11. The word “*upfront*” in paragraph 6 is closest in meaning to

- A) initial
- B) hidden
- C) uneven
- D) fragile

12. In paragraph 7, the author includes the examples of Uganda and Côte d’Ivoire primarily to

- A) prove that rural communities reject expensive modernization projects.
- B) demonstrate that lower-cost housing interventions are also possible.
- C) argue that retrofitting homes should fully replace new construction.
- D) show that malaria rates are identical across African countries.

13. According to paragraph 7, why might policymakers face difficult choices regarding housing interventions?

- A) Because communities generally prefer conventional mosquito-control campaigns.
- B) Because international agencies oppose structural disease prevention measures.
- C) Because resources must be divided between different prevention strategies.
- D) Because existing homes cannot be modified without major reconstruction.

14. There are four locations in the paragraph below marked (A), (B), (C), and (D). Where would the following sentence best fit?

“Such measures may provide a practical alternative for families unable to afford entirely new homes.”

Lower-cost retrofit interventions provide a complementary strategy. [A] Trials in Uganda and Côte d’Ivoire have shown that measures such as house screening and eave tubes can provide durable protection at far lower cost. [B] Yet even these cheaper interventions may remain financially inaccessible for many households. [C] Policymakers must therefore balance investments in new health-optimized housing against upgrading existing homes, as well as one-time structural interventions against conventional measures such as insecticide-treated nets and indoor residual spraying that require continuous delivery. [D]

15. In paragraph 7, why does the author compare housing modifications with insecticide-treated nets and indoor spraying?

- A) To demonstrate that spraying campaigns are easier to organize nationally.
- B) To compare the long-term value of different prevention approaches.
- C) To argue that housing projects should receive all available funding.
- D) To prove that conventional interventions are no longer effective.

16. Which rhetorical strategy is most evident in paragraph 8?
- A) The expansion from one study to wider public health implications.
 - B) The comparison between rural and urban public health systems.
 - C) The use of statistical evidence to challenge scientific findings.
 - D) The use of a counterexample to weaken an earlier argument.
17. What broader point does the author make in paragraph 8?
- A) The use of numerical evidence to question earlier conclusions.
 - B) The extension of one study toward broader public health issues.
 - C) The comparison between urban growth and rural health systems.
 - D) The introduction of contrasting examples to challenge prior claims.
18. Which statement best paraphrases the author's overall view of housing-based disease prevention?
- A) Housing improvements are useful mainly in rapidly urbanizing regions.
 - B) Structural prevention should replace traditional public health measures entirely.
 - C) Housing-based prevention offers promise but cannot solve every problem alone.
 - D) Conventional public health measures remain more sustainable than housing reforms.
19. Which of the following best states the main idea of the passage?
- A) Rural African communities continue to resist housing modernization projects.
 - B) Malaria control strategies should focus mainly on reducing mosquito populations.
 - C) Childhood diseases in Africa are caused more by poverty than by housing quality.
 - D) Better housing design can reduce several diseases and support public health goals.
20. Which of the following best describes the organization of the passage?
- A) The passage compares several diseases before rejecting housing as a solution.
 - B) The passage criticizes previous research before proposing a medical alternative.
 - C) The passage explains architectural methods and then focuses only on economics.
 - D) The passage presents a study, explores its implications, and discusses limitations.



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GABARITO

1. **B**
2. **C**
3. **A**
4. **D**
5. **D**

-
6. **C**
 7. **A**
 8. **D**
 9. **A**
 10. **C**

-
11. **A**
 12. **B**
 13. **C**
 14. **B**
 15. **B**

-
16. **A**
 17. **B**
 18. **C**
 19. **D**
 20. **D**