

Asthma Control: Home-Based Multi-Trigger, Multicomponent Environmental Interventions for Children and Adolescents with Asthma

Task Force Finding and Rationale Statement

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Task Force Finding and Rationale Statement

Intervention Definition

These interventions involve trained personnel making one or more home visits to conduct activities within the home. These activities focus on reducing exposures to a range of asthma triggers (allergens and irritants) through environmental assessment, education, and remediation. Most programs include additional components, such as self-management training, social support, and coordinated care, in conjunction with efforts to reduce asthma triggers in the home environment.

Task Force Finding (June 2008)

The Community Preventive Services Task Force recommends the use of home-based, multi-trigger, multicomponent interventions with an environmental focus for children and adolescents with asthma on the basis of strong evidence of effectiveness in reducing symptom days, improving quality of life or symptom scores, and in reducing the number of school days missed.

Rationale

The evidence was considered strong on the basis of findings from 23 studies included in this effectiveness review, including 14 studies of greatest design suitability and 9 studies of least design suitability.

Sixteen studies evaluated changes in one or more measures of quality of life among children with asthma and observed, overall, improvements in both symptom-free days and in scores from symptom or quality of life surveys. Of these studies, six evaluated changes in asthma symptom days and observed a median reduction of 0.8 days in the previous 2 weeks (interquartile interval (Range -2.3 to -0.6) or 21 fewer symptom days per year. Another nine studies reported changes in symptom or quality of life scores and observed a median relative improvement of 16.5% (IQI: +1.8% to +25%).

Ten studies evaluated changes in one or more productivity outcomes and observed, overall, improvements in school days missed due to asthma. Five of these studies observed a median absolute reduction of 12.3 school days missed per year (Range: -31.2, -3.4).

Eighteen studies evaluated changes in the use of healthcare services among study participants. Overall, improvements observed across this body of evidence were small. Ten of these studies reported a median reduction in the total number of asthma acute care visits of 0.57 visits per year (IQI: -1.71, -0.33). Eleven of these studies evaluated changes in the proportion of children requiring one or more acute care visits for asthma in the past year and observed a median absolute percent reduction of 5.4 percentage points (IQI: -19.2 percentage points to +1.6 percentage points).

The economic findings are based on the results of thirteen studies described in fourteen papers, all but one of which were also included in the assessment of effectiveness. Seven of the thirteen studies were cost analyses that only provided information on intervention costs. The remaining six studies considered both costs and benefits of the interventions; three were cost-benefit analyses and three were cost-effectiveness analyses.

The range of environmental remediation and education provided by the interventions varied considerably in cost, effort, and materials. Minor remediation efforts at minimum provided advice on recommended environmental changes to be performed by the members of the household and often provided low cost items such as mattress and pillow allergen impermeable covers. Moderate remediation included the provision of multiple low cost materials, and the active

involvement of the trained home visitor(s). Activities in this category included the provision and fitting of mattress and pillow allergen impermeable covers, small air filters and dehumidifiers, integrated pest management, professional cleaning services or equipment, and minor repairs of structural integrity (patching holes). Major remediation efforts involved structural improvements to the home including carpet removal, replacement of ventilation systems, or extensive repairs of structural integrity (roof, walls, and floors).

The program cost per participant ranged from \$231 to \$14,858 (adjusted to 2007 dollars) for all thirteen interventions. For the three interventions that involved major environmental remediation, cost per participant ranged from \$3,796 to \$14,858 (2007\$). By contrast, the ten interventions with minor to moderate remediation and an educational component were less expensive and cost \$231 to \$1,720 (2007\$) per participant.

The six studies with full economic summary measures were on interventions with minor to moderate remediation and an educational component. The three cost-benefit studies reported benefit-cost ratios ranging from 5.3 to 14.0, suggesting that these interventions provide substantial returns for each dollar invested. The three cost-effectiveness studies reported the cost per additional symptom-free day ranging from \$12 to \$57 (2007\$). These numbers when converted to 2007 dollars per QALY (based on the ratio: 1 QALY = 1,800 SFDs; Wild et al., 2005) are lower than \$107,000, the adjusted value in 2007 dollars of the standard \$50,000 cut-off used in the cost-effectiveness literature, and indicate good value for money invested. If improvements in productivity associated with reduced work days (for parents or guardians) and school days missed were monetized, the interventions would become more cost-effective. Additional evidence is needed to determine the cost-benefit and cost-effectiveness of major remediation interventions.

Most studies were conducted in the United States, targeting children with asthma in urban, low SES, and minority communities. Although studies did not specifically examine the effectiveness of these interventions among adolescents with asthma, several studies included adolescents, and the Task Force considers the evidence on effectiveness and the economic findings applicable to this population. The interventions were conducted by a range of organizations including academic institutions, healthcare clinics or systems, state and local health departments, and community-based organizations. Trained personnel delivering these interventions included most commonly community health workers, but also nurses, respiratory therapists, social workers, and physicians.

Economic Review

The Task Force finds that the combination of minor to moderate environmental remediation with an educational component provides good value for the money invested based on improvement in symptom free days and savings from averted costs of asthma care and improvement in productivity.

References

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Publications

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Disclaimer

The findings and conclusions on this page are those of the Community Preventive Services Task Force and do not necessarily represent those of CDC. Task Force evidence-based recommendations are not mandates for compliance or spending. Instead, they provide information and options for decision makers and stakeholders to consider when determining which programs, services, and policies best meet the needs, preferences, available resources, and constraints of their constituents.

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