A clinical decision support system reduced antimicrobial use for acute respiratory tract infections in rural settings

Samore MH, Bateman K, Alder SC, et al. **Clinical decision support and appropriateness of antimicrobial prescribing: a randomized trial.** JAMA. 2005;294:2305-14.

Clinical impact ratings: GIM/FP/GP ★★★★★☆☆ Infectious Disease ★★★★★☆☆ Public Health ★★★★★★☆

QUESTION

Does a clinical decision support system (CDSS) plus a community intervention reduce antimicrobial use for acute respiratory tract infections (RTIs) in rural primary care settings more than a community intervention alone?

METHODS

Design: Cluster randomized controlled trial.
Allocation: Unclear allocation concealment.*
Blinding: Unblinded.*
Follow-up period: 21 months.
Setting: Rural communities in Utah and Idaho, United States.
Participants: 67 910 persons (50% women, 70% adults) from 12 rural communities. 6 nonrandomized communities (n = 19 310) served as a reference group.
Intervention: A CDSS plus a community intervention (6 communities, n = 32 490) or a community intervention alone (6 communities, n = 35 420). The CDSS intervention included 3 parallel decision support tools (2 paper-based versions including flow charts or self-completed medical histories and 1 personal digital assistant version), each providing the diagnostic and therapeutic guidelines on several acute RTIs (e.g., sinusitis, pharyngitis, and otitis media). The CDSS was introduced to primary care clinicians by educational lectures, small group meetings, and 1-on-1 interactions between primary care clinicians and physician members of the study team. Clinicians were asked to use the guidelines for ≥ 200 consecutive patients with RTIs. The community intervention was designed to map constructs within behavior change models and included 2 waves. The first wave included a meeting with community leaders, news releases in the print media, distribution of educational materials (posters and brochures about appropriate antimicrobial use) at pharmacies and physician offices, and a refrigerator magnet mailed to parents of children < 6 years of age that emphasized not to treat viral infections with antibiotics. The second wave included magnetic flip charts with self-management guidelines for RTIs that were distributed by clinics at health fairs and special events and during 1-on-1 interactions with community residents, and a series of articles focusing on behavioral change messages distributed to community newspapers.
Outcomes: Antimicrobial use with adjustment for cluster effects.
Patient follow-up: All 12 clusters completed the study (intention-to-treat analysis).

MAIN RESULTS

83% to 100% of clinics and pharmacies in each community participated in the distribution of educational materials. 45% (80 of 176) of the primary care clinicians in the CDSS group attended > 1 of the annual continuing medical education sessions and 71% used the decision support tools. Antimicrobial use was obtained from retail pharmacy data. After 21 months, the antimicrobial prescribing rate decreased by 8.8/100 person-years in the CDSS group compared with an increase of 0.9/100 person-years in the community intervention-alone group. Diagnosis-specific antimicrobial use was assessed by chart review (charts of 79% of primary care clinicians, 13 081 acute RTI visits). Rates for prescribing antibiotics in the "never-indicated" category decreased more in the CDSS group than in the community intervention–alone group (relative risk reduction 32% vs 5%, P = 0.03).

CONCLUSION

Compared with a community intervention alone, a clinical decision support system plus a community intervention reduced antimicrobial use for acute respiratory tract infections in rural primary care settings.

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*See Glossary.

COMMENTARY

The study by Samore and colleagues is an important contribution to the existing literature about community-based interventions on antibiotic prescribing because it is one of a few well-designed studies to be completed. Welschen and colleagues showed a 12% absolute reduction in antibiotic prescribing for respiratory tract infections in general practice (1). In a nonrandomized trial, Gonzales and colleagues found a 26% reduction of antibiotic prescribing for uncomplicated acute bronchitis in a large-scale, population-based, multidimensional intervention (2).

Samore and colleagues found that a CDSS added to a multifaceted community intervention reduced prescribing rates, while the community-based intervention alone had no effect. An absolute reduction of 9% in antibiotic prescribing is a modest effect given the high prescribing rates in the United States. However, the reduction of macrolides may have greater importance because a reduction in macrolide use may reverse antibiotic resistance (3).

This study has some important limitations. The intervention at the primary care level consisted of much more than a CDSS, such as educational lectures, group meetings, pay for performance, and feedback on prescribing practices. It is unclear which components contributed to the results, whether this intervention is easy to reproduce in other settings, and whether it is sustainable over time. Patient preferences and values for antibiotic use and respiratory infections were also not included in the system. Finally, the categorization of diagnoses for which antibiotics were "always indicated" is debatable, especially for acute otitis media (4) and streptococcal pharyngitis (5).

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References

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