Overview

The goal of the Combating Antimicrobial Resistance through Rapid Implementation of Available Guidelines and Evidence (CARRIAGE) QUERI program is to address the growing public health crisis of antimicrobial resistance through strategies that support the uptake of new and existing evidence-based practices, policies, and programs that target the improved use of antibiotics and the prevention of healthcare-associated infections. The CARRIAGE program is a series of related projects unified around the common goal of arresting and potentially reversing the spread of antimicrobial resistance in VA healthcare facilities and beyond. CARRIAGE investigators will accomplish this with rapid, cross-cutting, and interdisciplinary approaches that combine elements of quality improvement and implementation science, and which target the processes that contribute to the development and spread of resistance.

By creating an integrated “implementation network” of VA sites around a core team of implementation scientists, CARRIAGE QUERI will establish an infrastructure for rapidly deploying interventions within a broad complex of VA facilities across the nation. Specifically, CARRIAGE QUERI will address the growing concern of antimicrobial resistance through strategies targeting improved use of antibiotics and the prevention of healthcare-associated infections (HAI) across VA patient care settings by:

- Fostering improved handwashing practice by repairing the broken audit-and-feedback mechanism in VA acute-care hospitals via a VISN-wide quality improvement project;
- Supporting and enhancing the implementation of new VA guidelines to detect and prevent the spread of carbapenem-resistant Enterobacteriaceae in VA hospitals; and
- Promoting judicious inpatient antibiotic use through a novel antibiotic self-stewardship “timeout” project that prompts VA providers to evaluate the continued need for antibiotics.

Implementation Strategy

CARRIAGE QUERI will employ complementary implementation strategies, including audit and feedback, clinical decision support, external facilitation, provider education and activation, and adherence engineering. The Promoting Action on Research in Health Services (PARiHS) framework will be used to assess contextual factors influencing implementation within facilities, while work system barriers and facilitators will be assessed using the Consolidated Framework for Implementation Research (CFIR) and the Systems Engineering Initiative for Patient Safety (SEIPS) model. Data collection methods will include the use of national VA datasets, direct observation, and primary data (i.e., surveys, interviews, and focus groups).
Project Summaries

- **Project 1 (Quality Improvement):** Foster improved hand-washing practice by repairing the broken audit-and-feedback mechanism in VA acute-care hospitals via a VISN-wide QI project. Despite hand hygiene’s (HH) fundamental place in infection prevention, compliance rates remain substantially below target levels. Evidence indicates that audit and feedback—a well-established implementation strategy for provider behavior change—can substantially increase HH compliance. This planned one-year QI initiative will compare two different audit and feedback methods within five VISN 23 acute care facilities.

- **Project 2:** Support and enhance the implementation of new national VA guidelines to detect and prevent the spread of carbapenem-resistant Enterobacteriaceae in VA hospitals. Carbapenem-resistant Enterobacteriaceae (CRE) are gram-negative organisms resistant to a broad range of antimicrobial agents called carbapenems and have accounted for a steadily increasing rate of colonization and infections in healthcare settings every year. CRE is associated with increased morbidity and up to 50% mortality as these bacteria are resistant to nearly all antibiotics currently available. CARRIAGE QUERI will conduct a learning evaluation that blends QI and implementation methods, and CFIR and the SEIPS model to evaluate and enhance VHA CRE guideline implementation by providing feedback to operations partners and the field on the current impact of implementation strategies.

- **Project 3:** Promote judicious inpatient antibiotic prescribing through a novel antibiotic self-stewardship “timeout” project that prompts VA providers to evaluate the continued need for empiric antibiotics. Antimicrobial Stewardship Programs (ASPs) that combine education, clinical guidelines, decision support, restrictions on antimicrobial use, and interventions to change antimicrobial therapy can reduce antibiotic use and resistance, and improve patient outcomes. This project will evaluate the implementation of one of the three core programs for antimicrobial stewardship recommended by the CDC, namely an “Antibiotic Timeout” three days after the initiation of antimicrobial therapy.

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**Principal Operational Partners**
- National Infectious Diseases Service
- Multi-Drug Resistant Organism Program Office
- National Center for Patient Safety
- VA Antimicrobial Stewardship Task Force

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