IDA | Research Summary

Optimizing Procurement and Investment for Medical Items Using DIBOpt

The COVID-19 pandemic has disrupted global supply chains, exacerbating previously existing challenges with procurement and inventory management of medical items for civilian and military uses. IDA's Defense Industrial Base Optimization Model (DIBOpt) was used to optimize budget and procurement plans for chemical, biological, radiological, and nuclear (CBRN) medical countermeasures.

Stockpiling sufficient CBRN medical countermeasures, like nerve-agent countermeasure autoinjectors, is made more complicated by price increases, sole-source manufacturers, product modernization, changes in required quantities, distribution into medical equipment sets, forward storage/stockpiling in different combatant commands, constrained budgets, expiration of items currently in inventory, and costs of and planning for shelf-life extension programs. The complexity and evolving nature of managing these stockpiles called for a modeling solution to efficiently collect relevant input data and generate quick-turn analyses.

Originally developed as a model to assess munitions readiness, DIBOpt was designed to capture important dynamics of the industrial base and supporting supply chains for any item or consumable. Features like supply chain interdependencies, investments, shared production lines, production lead times, facility production rates, demand profiles, and substitution were already part of the DIBOpt structure. To model medical items, DIBOpt was enhanced to allow tracking of individual items by unique lots and to account for lot expirations.

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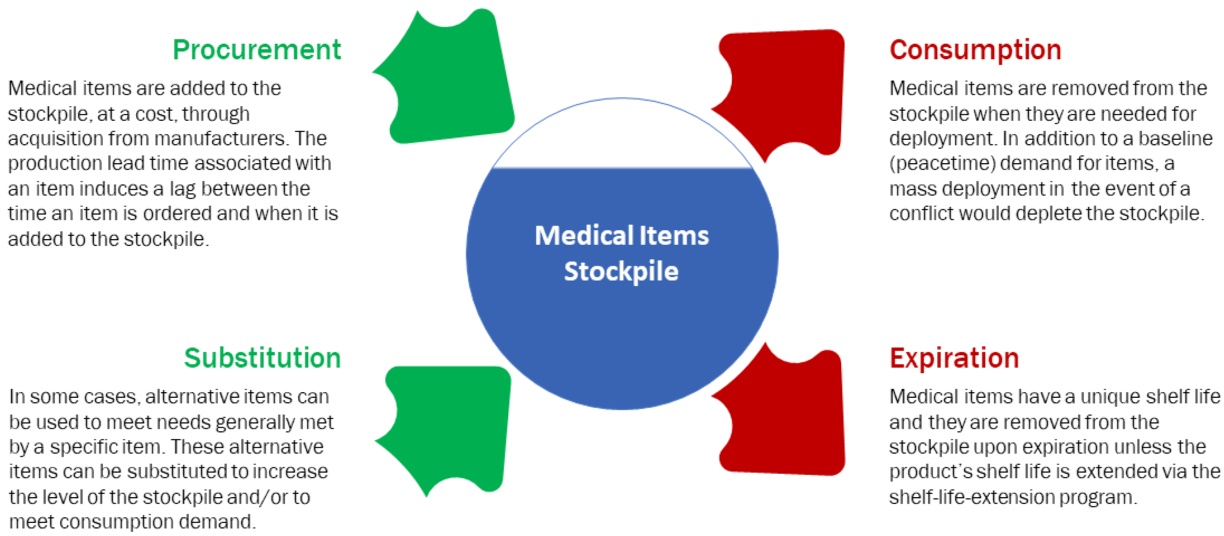
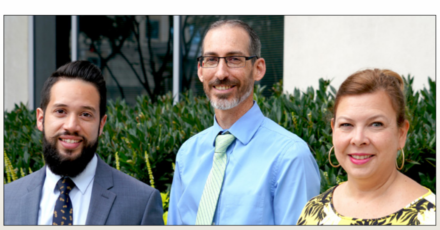
IDA used DIBOpt and the best available data for a range of medical items, such as nerve agent treatments and antibiotics. These items are carried by individual service members for their own or others' use, or they are distributed into medical equipment sets at forward medical units to be administered to soldiers under treatment. To conduct an integrated, comprehensive inventory and budget assessment of these items, IDA examined current and future inventories under a range of budgets. IDA also assessed the impact of impending changes, including the introduction of new items with significantly higher prices, constraints to the production of new items, and mass expirations of medical items.

Though only a fraction of the capabilities available within DIBOpt were leveraged in the first phase of the study, IDA successfully generated a set of products that were used to inform Program Objective Memorandum (POM) budget requests for acquiring CBRN medical countermeasures. These products included purchasing plans to meet inventory requirements while minimizing lot expirations.



The next phase of this research will exercise additional DIBOpt capabilities as IDA explores the supply chains that support key items to determine where bottlenecks exist, the effect of those chokepoints on the ability to build inventories, and the mitigation strategies necessary to reduce risk associated with inventory deficits.

DIBOpt grew from a cross-cutting study led by the Joint Staff on options for mitigating operational risk brought about by potential shortfalls in precision-guided munitions. The model was enhanced and used to support the Deputy Assistant Secretary of Defense for Industrial Policy, in response to Executive Order 13806, *Presidential Executive Order Assessing and Strengthening the Manufacturing and Defense Industrial Base and Supply Chain Resiliency of the United States*, as well as other activities in the Office of the Secretary of Defense. DIBOpt will also be used in future assessments of critical items for the Department of Defense and the Department of Homeland Security.



A team of researchers from the Systems and Analyses Center's Strategy, Forces and Resources Division collaborated on this project. Pictured are **Daniel E. Lago** (dlago@ida.org), **Sean M. Oxford** (soxford@ida.org), and **Julie C. Kelly** (jkelly@ida.org). Jon M. Davis and Carla D. Wheaden also contributed to this work. The research was sponsored by the U.S. Army Office of the Surgeon General, G-37 Force Management, Chemical, Biological, Radiological, and Nuclear Branch.