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AWARDS BRIEF



Improving safety and patient outcomes by preventing hospital-acquired complications

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Dr. Chopra's research program is devoted to improving the use of vascular access devices and preventing device-associated complications, which rank among the most costly and prevalent healthcare-acquired conditions in the U.S.

This work, which has provided insights into the intersection between physician decision-making, nursing practice, clinical care, and appropriateness of use, has served as a robust model for understanding the origins of hospital-acquired complications.

Dr. Chopra's research has helped shape policy and practice around intravenous (IV) devices at the local, regional, national, and international level in several ways, and is poised to continue to make major contributions to improved healthcare quality and safety in the years to come.

Developing essential evidence to guide a common practice

Inserting an intravenous (IV) device is the most common procedure performed in hospitalized medical patients. IV devices may be used to provide medications, fluids, blood products, chemotherapy, or nutrition, monitor vital signs, or draw blood. But these devices are also the root of many dangerous complications, and the risks intensify when they are used inappropriately.

One type of long-term device, a peripherally inserted central catheter (PICC), is a small, flexible tube that is inserted into a vein in the upper arm, and can remain in place for weeks or months. Due to convenience, cost-effectiveness, and safer insertion, PICC use has grown significantly in recent years, but so too has substantial variation and inappropriateness in the use of this device. PICC-associated adverse events, including blood clots and infections, remain prevalent among hospitalized patients, and represent two of the most costly and potentially deadly types of healthcare-associated conditions in the country.

Early on in his training, Dr. Chopra, a hospitalist physician, recognized the lack of available evidence to support clinical decision-making around IV device

use—an area with myriad options and indications that vary depending on a complex set of factors—and decided to focus his research agenda on strengthening the knowledge base around these devices to support clinical practice.

In 2015, Dr. Chopra led an international, interprofessional group of expert colleagues (including others from the U-M Medical School and VA Ann Arbor Healthcare System) in developing the first comprehensive set of recommendations to evaluate the most common IV devices, indications, patient populations, and settings for use, called the Michigan Appropriateness Guide for Intravenous Catheters (MAGIC). The guide reviews when and under what conditions placing a PICC is appropriate, recommends when alternatives would be better, and provides best practices for PICC insertion, care, and maintenance. Published in the September 2015 *Annals of Internal Medicine*, MAGIC is based on the expert panel's review of more than 600 patient and treatment scenarios, and represents the first time specialties

Local, nationwide, and global impact of Dr. Chopra's work

- Guidance on PICC appropriateness has been incorporated into decision-making practice at UMHS and the University of Pennsylvania
- Research evidence is being implemented to inform appropriate use of PICCs in hospitals across the state within a 51-member collaborative quality initiative funded by Blue Cross Blue Shield of Michigan
- Research has informed national standards and practice guidelines for the use of vascular access devices, including Choosing Wisely Recommendations and U.S. infusion nursing standards
- Various PICC appropriateness tools are being developed, tested, and validated in diverse settings around the world



“IV devices involve a whole “fruit salad” of stakeholders, from nurses to physician specialists, to device manufacturers, to hospital management, to payers, and, most important, patients. Focusing my work in this area forced me very early on to think about collaborative science and interdisciplinary approaches to solving common problems, **incorporating the views of many perspectives when developing solutions.**”

— Vineet Chopra

across medicine, nursing, surgery, radiology, and pharmacy convened to address setting standards in vascular access.

Dissemination locally and nationwide

MAGIC’s uptake and subsequent effect on standardizing practice, particularly in the appropriate use of PICCs, have already been significant. MAGIC recommendations for PICC use have been integrated within an electronic order-set at the U-M Health System, helping identify if a PICC is the best choice, and if so, what device characteristics might reduce harm. Other hospitals and health systems across the country, including the University of Pennsylvania, have incorporated MAGIC recommendations into practice, with Dr. Chopra assisting with adaptation and implementation at various sites.

Now, with his mentor Dr. Scott Flanders, the first large-scale implementation of MAGIC is rolling out across 51 hospitals that are part of the Michigan Hospital Medicine Safety (HMS) Consortium, a Collaborative Quality Initiative supported by Blue Cross Blue Shield of Michigan. These efforts will guide the use of PICCs in hospitals of varying size and capabilities, from 50 beds to 2000+ beds, potentially impacting the quality, care, and safety of thousands of hospitalized patients.

Nationally, MAGIC’s recommendations are being incorporated into forthcoming revisions to CDC guidelines for infection prevention, as well as the 2016 Infusion Nursing Standards of Practice. Based on research from Dr. Chopra and his team, ABIM Choosing Wisely Recommendations from the Society of General Internal Medicine now caution physicians against routinely using PICC lines—and leaving them in place for longer than necessary—simply for provider or patient convenience. Dr. Chopra’s team is also exploring how to deploy MAGIC across the Veterans Affairs health system.

Advancing the science through international knowledge exchange

MAGIC recommendations have been incorporated in a CDC-funded initiative to reduce central line associated bloodstream infection (CLABSI) rates among a targeted group of hospitals across the country; Dr. Chopra is helping with this multi-pronged intervention led by his mentor, Dr. Sanjay Saint. Dr. Chopra is also helping facilitate the international validation and implementation of his research on PICCs, in countries hungry for evidence-based guidance on IV practices. Validation and implementation efforts are underway in places such as China, India, Italy and Australia. And looking overseas provides some insight into policy improvements that could be made here at home.

Dr. Chopra’s ImprovePICC.com website provides the research and tools his team has developed on PICC use, receiving 300+ unique visitors each week, many from outside the U.S. Dr. Chopra and team are now building an app that synthesizes MAGIC recommendations and makes them accessible for bedside decision-making by healthcare providers and useful for patients as well.

Keys to Impact: Dr. Chopra’s lessons learned and shared

- Translating research into practice requires careful planning and outreach—Identify key stakeholders early on and engage them.
- Consider implementation at all steps of the process, and remember that the simpler and easier for the end user, the better.
- Culture will eat strategy for lunch! Make sure to understand the organization when working on dissemination and outreach.

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