SANFORD GUIDE

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MAKING THE CASE FOR SANFORD GUIDE

An evidence-based summary of how Sanford Guide supports **antimicrobial stewardship and infection prevention,** helping you:

- **Meet regulatory requirements**
- **Adopt industry best practices**
- **Improve patient outcomes**

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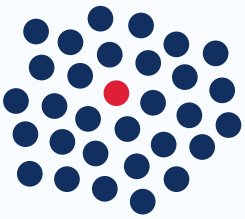
Executive Summary

BACKGROUND

Health-care acquired infections, antimicrobial resistance, and antibiotic prescribing that is discordant with guidelines are challenges for hospitals and health systems in the United States.

1 in 31

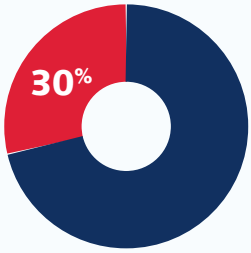


On a given day, approximately 1 in 31 hospitalized patients has at least one healthcare-associated infection[4]

2.8+ million infections

35,000 deaths

Greater than 2.8 million antibiotic-resistant infections occur in the U.S. each year resulting in more than 35,000 deaths[5]



Approximately 30% of all antibiotics prescribed in hospitals in the U.S. are either unnecessary or inappropriate in selection, dose, or duration[1]

REGULATORY STANDARDS

The Joint Commission Standards and the Centers for Medicare and Medicaid Services (CMS) Conditions of Participation include requirements for antibiotic stewardship programs (ASP). There are also implications for ASPs in the CMS Hospital Value-Based Purchasing Program.

- CMS requires that hospitals demonstrate adherence to nationally recognized guidelines/best practices (ex: CDC guidelines and guidance)
- The Joint Commission requires hospitals to establish antimicrobial stewardship as an organizational priority through support of its ASP (including financial and information technology resources to support the ASP)
- The Value-Based Purchasing Program evaluates indicators related to pneumonia, hospital-acquired infections, and surgical site infections

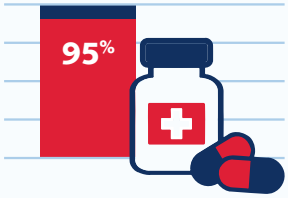
IMPACT OF GUIDELINES ON PATIENT OUTCOMES

There is growing evidence that guideline-concordant prescribing improves outcomes for patients through improved antibiotic use and lower costs. The publication of new guidelines does not always change practice, and numerous barriers limit guideline adoption.

- Adherence to treatment guidelines for community-acquired pneumonia was associated with shorter hospitalization and improved survival[13]
- Use of altered therapy guidelines and antibiotic restriction lists of pre-authorized agents reduced annual operational costs by 17.1% and 17.5%, respectively[21]
- Difficulty with accessing guidelines leads to lack of use[16]

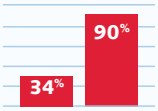
SANFORD GUIDE AS A SOLUTION

Around 77% of healthcare workers in the U.S. utilize mobile health apps regularly.[26] Use of apps promotes access to and knowledge of antimicrobial prescribing policy[27]



When using the Sanford Guide app, 95% of users modified prescribing practice based on the application[23]

A study by Walter Reed indicated that app usage directly increased antibiogram usage among residents from 34% to 90%.[23]



Information technology resource that supports ASP adherence to accreditation and regulatory standards with access to nationally recognized guidelines/best practices

Improved access to guidelines and use through brand reputation, user-friendly platforms, 365-day support, and customization. A study conducted at Walter Reed showed that 88% of users felt Sanford Guide was easy to use while 95% said it was better than the paper version. The app was used by 9 out of 10 residents.[23]

Background

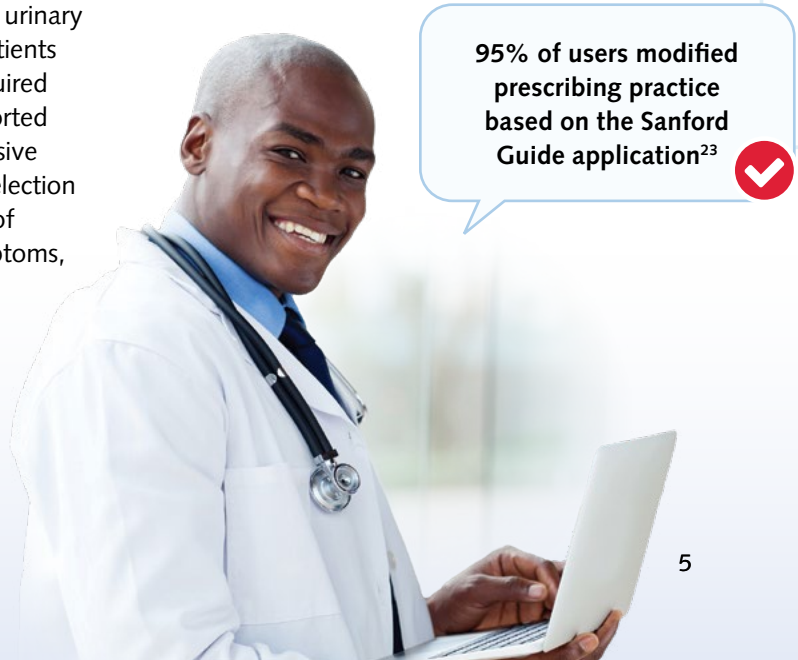
Accreditation organizations and federal government agencies emphasize reducing health-care acquired infections, decreasing antimicrobial resistance, and improving antibiotic prescribing. This is due, in part, to the following:

- Approximately 30% of all antibiotics prescribed in hospitals in the United States are either unnecessary or inappropriate in selection, dose, or duration[1]
- 20% of hospitalized patients who receive antibiotics have serious adverse effects[2]
- Use of unnecessary and duplicative antibiotics in hospitals in the United States led to an estimated $163 million in excess costs[3]
- On a given day, approximately 1 in 31 hospitalized patients has at least one healthcare-associated infection[4]
- More than 2.8 million antibiotic-resistant infections occur in the United States each year, resulting in more than 35,000 deaths[5]
- In 2017, 223,900 people required care for *Clostridioides difficile* and at least 12,800 people died[5]
- There has been an 18% reduction in deaths overall associated with antibiotic-resistant infection, and a 28% reduction in deaths in hospitalized patients since 2013. Strategies associated with these reductions include tracking and improving appropriate antibiotic use.[5]
- 77% of patients with a diagnosis of urinary tract infection (UTI) and 79% of patients with a diagnosis of community-acquired pneumonia (CAP) received unsupported antibiotic treatment including excessive duration of therapy, antimicrobial selection that deviated from guidelines, lack of documented infection signs or symptoms, and lack of microbiologic evidence of infection[6]

The Centers for Disease Control and Prevention (CDC) proposes that antibiotic stewardship programs (ASPs) can increase infection cure rates while reducing: treatment failures, *C. difficile* infections, adverse effects, antibiotic resistance, hospital costs, and length of stay.[7] The CDC also suggests that prescribers and pharmacist have an opportunity to improve prescribing by optimizing antibiotic selection, re-assessing treatment when results of diagnostic testing have returned, and using the shortest effective duration of therapy. Using the CDC Core Elements of Hospital Antibiotic Stewardship Programs is a well-established method for accomplishing those outcomes. The Core Elements were updated in 2019 and include the following 7 areas:

- Hospital leadership commitment
- Accountability
- Pharmacy expertise
- Action
- Tracking
- Reporting
- Education

Each area of the CDC Core Elements includes priority examples for implementation. One example is that the hospital leadership commitment includes providing programs dedicated time and resources to operate effectively.



Regulatory Standards

Major hospital accrediting organizations have incorporated the CDC Core Elements for Hospital Antibiotic Stewardship Programs into their accreditation standards, and the Centers for Medicare and Medicaid Services (CMS) has recently updated the Conditions of Participation for hospitals to include requirements for antimicrobial stewardship.[8] These Conditions of Participation include the following requirements:

- Antibiotic stewardship programs to help reduce inappropriate antibiotic use and antibiotic resistance for hospitals
- Hospitals demonstrate adherence to nationally recognized guidelines/best practices (ex: CDC guidelines and guidance)
- Document the evidence-based use of antibiotics in all departments and documents any improvements (including sustained improvements in proper antibiotic use)

The Joint Commission requirements include the following, among others:[9]

- The hospital establishes antimicrobial stewardship as an organization priority through support of its ASP (including financial and information technology resources to support the ASP)
- The ASP uses organization-approved multidisciplinary protocols (proposed change to the standard[10]): the ASP implements evidence-based guidelines that address diagnosis/treatment of CAP, UTI, skin and soft tissue infection (SSTI), and inappropriate use of urine testing for patients without symptoms of UTI)

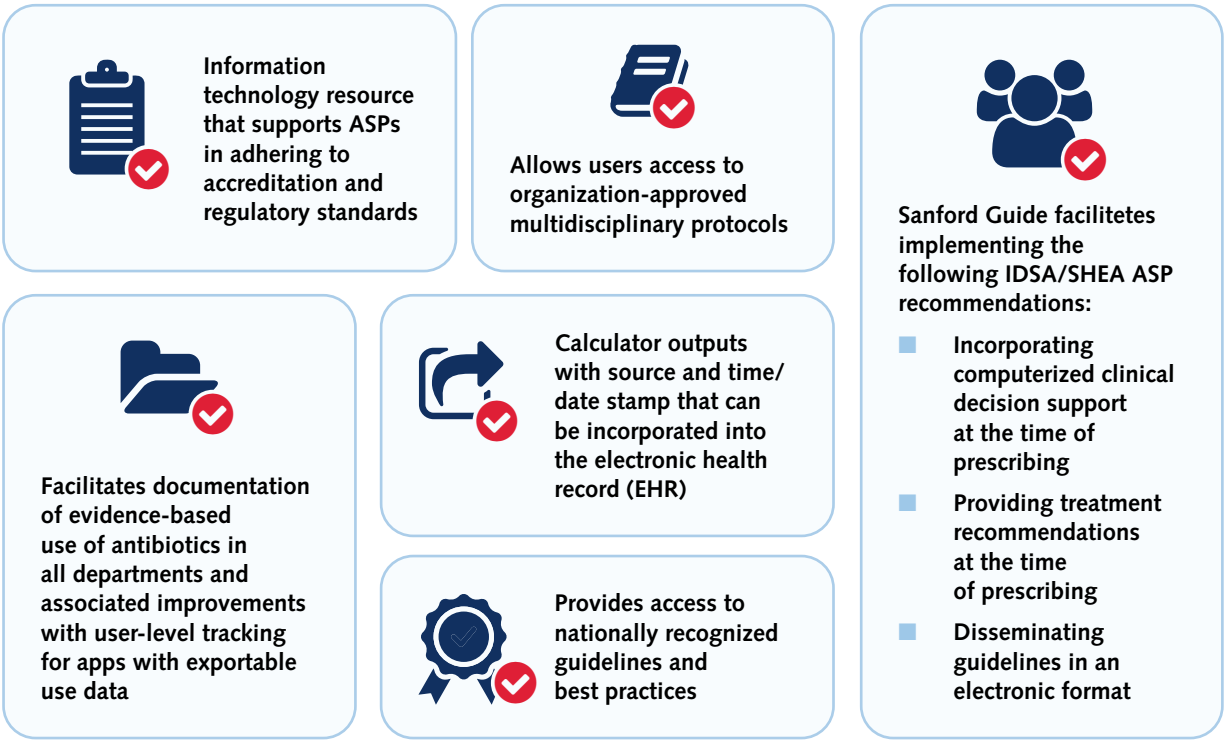
The CMS Hospital Value-Based Purchasing Program developed to improve the quality, efficiency, patient experience, and safety of care that Medicare beneficiaries receive during acute care inpatient stays also has several components that relate to antibiotic use, hospital-acquired infections, and clinical outcomes.[11] These include the following:

- Pneumonia 30-day mortality rate
- Catheter-associated urinary tract infections
- Central line-associated bloodstream infections
- *C. difficile* infections
- Methicillin-resistant *Staphylococcus aureus* infections
- Surgical site infections for colon surgery and abdominal hysterectomy

In response to the mounting evidence regarding antibiotic misuse, overuse, and abuse, and the need for strategies that could be quickly implemented in hospitals, the Infectious Diseases Society of America (IDSA) and the Society for HealthCare Epidemiology of America (SHEA) published updated guidelines for implementing an antibiotic stewardship program.[12] Among the many recommendations that were provided were several regarding implementation of technology in ASPs.

- Incorporate computerized clinical decision support at the time of prescribing
- Provide treatment recommendations at the time of prescribing which has been associated with reduced use of broad-spectrum antibiotics, improved antibiotic dosing, reduced antibiotic resistance, more appropriate antibiotic selection, fewer prescribing errors, reduced adverse effects, reduced antibiotic costs, reduced length of stay, and reduced mortality
- Develop a strategy for guideline dissemination in an electronic format

SANFORD GUIDE SOLUTIONS FOR REGULATORY COMPLIANCE



Impact of Guidelines on Patient Outcomes

The CDC Core Elements, the IDSA/SHEA guideline, and the Joint Commission Standard all suggest that guidelines can and should be an integral part of antimicrobial stewardship programs. The proposed changes to the Joint Commission Standard go further by demanding that accredited organizations develop guidelines for CAP, UTI, SSTI, and inappropriate use of urine testing for patients without symptoms of UTIs.[10] There is growing evidence that guideline-concordant prescribing improves outcomes for patients and improves antibiotic use:

- Adherence to treatment guidelines for community-acquired pneumonia was associated with shorter hospitalization and improved survival[13]
- Lower mortality and shorter length of stay in patients who received guideline-adherent therapy[14]
- Antibiotic prescribing consistent with guidelines for severe CAP was independently associated with 30-day survival[15]

However, the publication of new practice guidelines does not always lead to changes in prescribing, and numerous barriers limit guideline adoption:

- Difficulty with accessing guidelines leads to lack of use[16]
- Dissemination and application of guidelines is low for the following reasons[17]:
  - Insufficient clarity, accessibility, and applicability
  - Need for critical thinking skills to adhere to guidelines

- Impact of the team prescribing process and peers on physicians in training
- The release of the IDSA UTI guideline did not change practice[18]:
  - Fluoroquinolones were prescribed 45% before and 42% after the guideline change
  - Greater than 75% of prescriptions were written for non-recommended treatment durations
- For non-necrotizing SSTI, 40% of patients received guideline concordant therapy while 70% received guideline concordant duration of therapy[19]

The Agency for Healthcare Research and Quality suggests that the following may be drivers of suboptimal antibiotic prescribing[20]:

- Fear of inadequate coverage/patient harm
- Fear of judgment by peers/superiors
- Not wanting to change therapy that others have started
- Feeling that one's patients are different
- Desire for autonomy
- Difficulty perceiving association between antibiotic prescribing and adverse events
- Not paying attention/lack of interest
- System based challenges: inadequate communication, difficulty getting accurate data from EHR
- Incomplete knowledge of antibiotic spectrum or new data

Several systematic reviews have identified that ASPs improve both economic and clinical outcomes through improving adherence to guideline-based prescribing.

- 25% of studies focused on alteration of antimicrobial therapy guidelines[21]
- Use of altered therapy guidelines and antibiotic restriction lists of pre-authorized agents reduced annual operational costs by 17.1% and 17.5%, respectively[21]

Use of unnecessary and duplicative antibiotics in hospitals in the United States led to an estimated $163 million in excess costs[3]

- Current IDSA guidelines suggest that ASPs focus on interventions that improve clinical outcomes for patients with specific infectious diseases which could be more clinically and financially meaningful to institutions with resultant decrease in length of stay and readmissions.[22]
- Education/guideline implementation have improved duration of therapy and guideline compliance especially for UTI[22]
- Adherence to treatment guidelines for pneumonia can reduce mortality and length of stay for patients hospitalized with CAP[22]
- ASP programs have limited capacity to perform daily reviews for all infections, but interventions such as guidelines require less maintenance[22]

SANFORD GUIDE SOLUTIONS TO IMPROVE GUIDELINE USE

Improved access to guidelines and use through brand reputation, user-friendly platforms, 365-day support, and customization. A study conducted at Walter Reed showed that 88% of users felt Sanford Guide was easy to use while 95% said it was better than the paper version. The app was used by 9 out of 10 residents.[23]

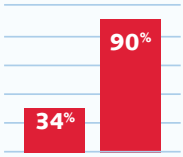
When providers desire autonomy, Sanford Guide provides **options** for treatment, when appropriate, and a discussion of when different treatments may be applicable. This differs from other services which make overly broad generalizations and imply that there is only one way to treat a patient.

Guidelines found in IDSA, CDC, and other clinical references tend to be cumbersome to navigate and difficult to apply in a fast-paced clinical setting. The Sanford Guide editorial board carefully curates guidelines to be clear, concise, and easy to follow even when time is short.

Helps walk clinicians through the decision-making process to critically analyze patient scenarios and adhere to the correct guidelines. **One study found that after implementation of the Sanford Guide app, 96% of users indicated that they could easily access the facility-specific antibiotic guidelines when needed.[34]**

When the fear of inadequate coverage or patient harm is a concern, Sanford Guide can be trusted as an authoritative source of industry standard guidelines. Stewardship pharmacists frequently rely on Sanford Guide to justify requests for medication adjustments.

When lack of knowledge of antibiotic spectrum or new data is a challenge, Sanford Guide provides interactive antibiograms and spectra of activity tables allowing prescribers to quickly see notes associated with a bug/drug mismatch and access to more comprehensive information about pathogens and anti-infectives with a single click or tap. The Walter Reed study indicated that app usage directly **improved knowledge of local resistance by 68% and increased antibiogram usage among residents from 34% to 90%.[23]**



Sanford Guide, (with or without Stewardship Assist customization), promotes guideline compliance **before** prescribing takes place, reducing the fiscal and time investment of a stewardship team changing treatment regimens after the fact. Clinical surveillance helps to identify errors in progress. **Sanford Guide helps to prevent errors before they occur.**

Sanford Guide makes retrieving guidelines easy and provides clarity. The editorial board, composed of nine infectious diseases experts, succinctly summarizes national guidelines for ease of applicability to the patient being treated.

Mobile applications and web-based platforms for ASP

Evidence supporting use of Sanford Guide:

72% of medical residents relied on the Sanford Guide for selecting empiric therapy[24]

88% of medical residents in another study found Sanford Guide with Stewardship Assist easy to use[23]

56% improvement in therapy de-escalation[23]

74% of providers considered themselves better stewards of antibiotics after implementation of the Sanford Guide app[34]

90% of residents were aware of institutional antibiograms, but only 44% knew how to access them[24]

91% of providers found the Sanford Guide app useful to their practice[34]

Evidence supporting use of digital references in general:

- 90% of physicians access drug information via a mobile app[25]
- Around 77% of healthcare workers in the United States utilize mobile health apps on a regular basis[26]
- Systematic review of thirteen studies focusing on smartphone or tablet apps and antimicrobial therapy with an aim to assess the impact on prescribing by physicians treating patients in the hospital concluded that[27]:
  - The most frequently accessed guidelines were respiratory, skin and soft tissue, and genitourinary infections
  - Increase in adherence to guidelines after app implementation, time saved, increased knowledge base
  - 77%->90% of users considered apps easy to use
  - Use of apps promotes access to and knowledge of antimicrobial prescribing policy
  - Use of apps increases adherence to guidelines in hospitals
  - All apps were standalone which facilitates easy implementation, low cost, and no risk regarding patient data
- Mobile platform advantages[28]
  - Available to a wide audience
  - Updated often
  - Can provide utilization information
- Numerous studies identified that relevant guidelines and antibiograms were the content most often accessed[28-30]
  - UTI, pneumonia, cellulitis, sepsis, SSTI, respiratory tract infections
- App with institution specific information resulted in improvements in appropriateness of therapy, decreased antibiotic use, and cost savings[31]
- Making apps accessible at the point of care facilitated in the moment decision making[32]
- Antibiotic decision accuracy improved from 66% pre-app to 87% post app. This was most apparent in respiratory, blood, and skin/soft tissue infections[33]

Key Components of Sanford Guide

- Most trusted name in the treatment of infectious diseases since 1969
- Values include expertise, reliability, usability, transparency, and independence
- Comprehensive drug and pathogen information (updated daily)
- Calculators with copy/paste functionality to document usage in the EHR
- Interactive tables (including duration of therapy)
- Broad range of topics covered
- External links to guidelines and literature
- Customizable with local guidelines and antibiograms

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