



## ANTIMICROBIAL STEWARDSHIP AND INFECTIOUS DISEASE

# Infectious Diseases and Antimicrobial Stewardship Program Helps Hospitals and Nursing Homes Improve Care and Save Lives

### BACKGROUND AND PROBLEM

Infectious disease physicians and pharmacists have advanced training in diagnosing, managing, and treating infections. They also have expertise in hospital epidemiology, preventing hospital-acquired infections, and using the lab to improve patient care. Hospitals and nursing homes that rely on these experts are able to reduce mortality and readmissions, optimize antimicrobial management, and combat multi-drug resistance<sup>[1,2]</sup>. Unfortunately, many facilities don't have access to infectious disease specialty care and quality antimicrobial stewardship programs, which are required by the Joint Commission and Centers for Medicare and Medicaid Services. As a result, inconsistent antibiotic use may impact patient care and clinical safety measures. Innovative solutions are needed to overcome geographic, economic, and clinical barriers to provide high-quality care and meet regulatory requirements.

### SOLUTION

The Intermountain Healthcare Infectious Diseases and Antimicrobial Stewardship Program has been recognized nationally for filling this gap by partnering with small community hospitals (SCH) and nursing homes (NH) to deliver high-quality care via safe and secure remote technology<sup>[3,4]</sup>. Comprehensive services include telephone advice available 24/7/365, electronic asynchronous consults, full telemedicine visits via encrypted, two-way audiovisual technology, antimicrobial stewardship program (ASP) support, and a monthly ECHO<sup>®</sup> telementoring webinar.

### RESULTS

Facilities that partner with the Intermountain Healthcare TeleHealth Infectious Diseases and Antimicrobial Stewardship Program are improving care and saving lives. TeleHealth infectious disease (ID) specialists, for example, have helped partners make significant strides in the evaluation and treatment of *Staphylococcus aureus* bacteremia (SAB)<sup>[5,6]</sup>. Patients with SAB treated by an ID specialist via telehealth have comparable results to those seen by traditional in-person ID consultation, with significant decreases in 30- and 90-day mortality. Since the inception of this program, over 120 consults for patients with SAB have been conducted using telehealth technologies.

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## OTHER CLINICAL BENEFITS:

- Significantly improved appropriate use of antibiotics (See Appendix)
- Decreased unnecessary meropenem and fluoroquinolone usage at critical access hospitals
- Identified more than 2,500 days of unnecessary antibiotics for urinary tract infection in the ED
- Implemented large-scale education and performance-improvement program
- Implemented rapid diagnostics protocol for bacteremia leading to shorter lengths of stay
- Facilitated more than 400 ID consultations for patients with previously unrecognized indication
- Completed more than 10 regulatory surveys without any antimicrobial stewardship findings or penalties
- Tracked and reported system data, which:
  - Improved awareness of antibiotic usage and prescribing patterns
  - Established facility benchmarking
  - Identified areas for improvement
  - Updated antibiogram for clinical decision making

## PROGRAM GROWTH

Since program inception in 2016, the Intermountain TeleHealth ID and AS Program has grown to provide support to clinical partners throughout the Intermountain West through:

- Pharmacist review of more than 11,000 charts
- More than 5,500 interactions with partner facilities, including phone calls, eConsults, telemedicine consults, and more.
- Over 5,500 instances of improved antimicrobial management, including discontinuation of unnecessary antibiotics, resolving drug-bug mismatches, and narrowing broad-spectrum antibiotics.
- Assistance with establishing antimicrobial stewardship teams at 19 facilities, including ongoing support with centralized data for benchmarking and mentorship of quality improvement projects. Targets for improvement include appropriate use of antibiotics, optimizing local processes, and comprehensive management of certain infections.

## THE PROGRAM'S SCOPE OF SERVICES ALSO INCLUDES:

- Direct to Patient scheduled video visits. This option provides follow-up care for qualifying patients in their home or another non-clinical environment. The service is designed to better meet patient needs and improve post-discharge follow-up. Visits are conducted with approximately one-third of patients who have met with an ID physician while hospitalized.
- Antimicrobial Stewardship Mentorship. TeleHealth ID experts help facility partners establish and maintain robust ASPs that improve patient safety and outcomes, decrease rates of *C. difficile* and multi-drug resistant infections, and reduce costs. For example, a quality improvement project conducted by the TeleHealth Program at a critical access hospital reduced fluoroquinolone prescribing for urinary tract infections by 10 percent. It saved approximately 100 days of unnecessary antimicrobials per year for asymptomatic bacteriuria.
- Monthly ECHO® Mentoring Program. This monthly tele-mentoring webinar reviews common ID conditions and AS topics, current guidelines and literature, quality improvement projects and best practices, along with case discussions and care management analysis

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## ECONOMIC BENEFITS

In SCHs and NHs located far from major population centers, it is expensive and difficult, if not impossible, to hire physicians with ID training. TeleHealth is an effective way to contract for specialized services without hiring full-time ID physicians. Revenue retained from patients managed at the local facility may come from labs, imaging, procedures, and appropriate antibiotic medications. Appropriate use of antibiotics improves patient outcomes, reduces antibiotic resistance, decreases costs associated with prolonged use, and helps prevent adverse events for hospitalized patients<sup>[7]</sup>.

A recent systematic review found that hospitals with an ASP save an average of \$435,000 (range: \$9,110–\$2.06 million) per year, or \$732 (range: \$2.50 –\$2,640) per patient<sup>[8]</sup>. Cost-reduction benefits included direct antibiotic costs, indirect costs, decreased length of stay, decreased readmissions, and more. Cost savings associated with ASPs have been demonstrated in long-term care facilities as well. One study conducted in a 60-bed urban long-term care facility found that weekly AS interventions resulted in a 21 percent reduction in antibiotic use and a 28 percent reduction in cost per patient day.<sup>[9]</sup>

## PATIENT AND COMMUNITY BENEFITS

Patients, families, and their loved ones want the best possible care, close to home, at the lowest possible cost. Healthcare costs are lower when patients receive care locally and avoid care in larger centers<sup>[10]</sup>. Families and loved ones avoid costs associated with travel, such as mileage, lodging, meals, and potentially lost wages. Community benefits consist of increased access to healthcare services, retention of jobs and wages, and decreased CO2 emissions from travel. Partnering with Intermountain Healthcare, an internationally recognized organization known for high-quality healthcare, demonstrates to providers, patients, and the community a facility's commitment to high-quality care.

## COLLABORATION WITH THE LOCAL TEAM IS KEY

The ID specialty is well suited for telehealth given the cognitive nature of the discipline, reliance on a detailed history, review of the medical record, and, when necessary, interactive patient consultation via a synchronous, secure audio-video connection. With the support of ID and AS services, local clinical staff have an added layer of reassurance that their interventions and treatments are comparable to an in-person ID consult.

Sustainable ID and ASPs require coordination and commitment from on-site administrators and the entire local clinical team. The TeleHealth team collaborates with the local team to preserve existing relationships among primary care providers and patients. Intermountain's multidisciplinary ID team partners with local primary care, pharmacy, infection prevention, and laboratory staff to provide guideline-concordant ID care, whether the patient is seen in-person or via telehealth technologies.

## ABOUT INTERMOUNTAIN HEALTHCARE

Intermountain Healthcare is a not-for-profit system of 25 hospitals, 225 clinics, a Medical Group with 2,800 employed physicians and advanced practice clinicians, a health insurance company called SelectHealth, and other health services in Idaho, Utah, and Nevada. Intermountain is widely recognized as a leader in transforming healthcare by using evidence-based best practices to consistently deliver high-quality outcomes and sustainable costs. For more information, see [intermountainhealthcare.org](http://intermountainhealthcare.org). Intermountain TeleHealth Services has been working with multiple clinical groups since 2014 and currently collaborates with more than 35 clinical services to improve care, reduce costs and improve clinical outcomes throughout eight states in the Intermountain West and Alaska.

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## APPENDIX INTERMOUNTAIN TELEHEALTH ANTIMICROBIAL STEWARDSHIP INTERVENTIONS

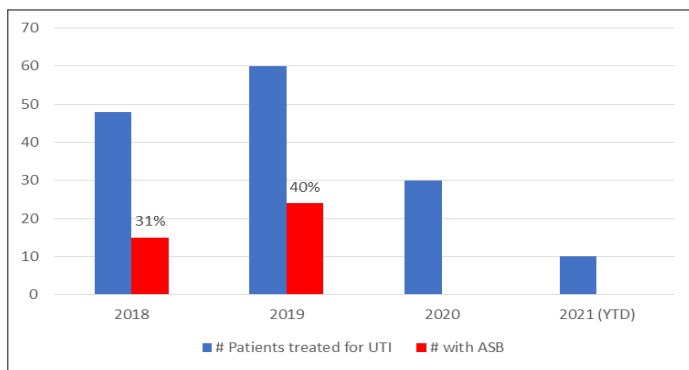
### IN CRITICAL ACCESS HOSPITALS

Here are three examples of impactful, sustainable quality improvement projects implemented at critical access hospitals that have partnered with the Intermountain Telehealth AS program:

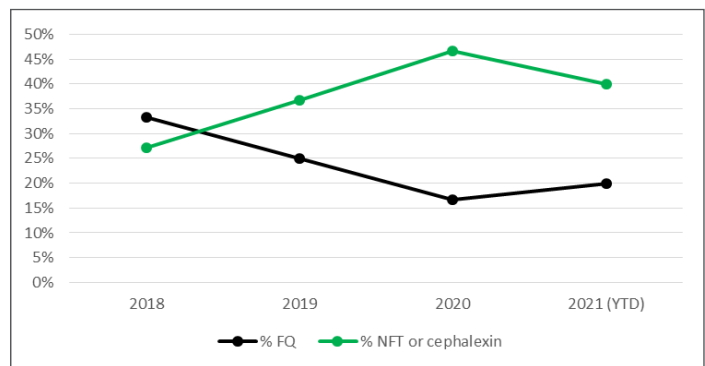
#### 1. Improved management of UTI and Asymptomatic Bacteriuria (ASB) at a Critical Access Hospital

A rural 10-bed hospital partnered with the Intermountain Telehealth AS program to identify inappropriate prescribing for UTI and ASB in its hospital, ED, and clinics. Medical records were reviewed for patients prescribed antibiotics for UTI. Data was collected on a quarterly basis regarding the diagnosis, presence or absence of UTI symptoms, antibiotic selection, and duration of treatment. Baseline data (2018/2019) along with best-practice recommendations were shared with local prescribers leading to significant improvements in antibiotic prescribing (2020/2021).

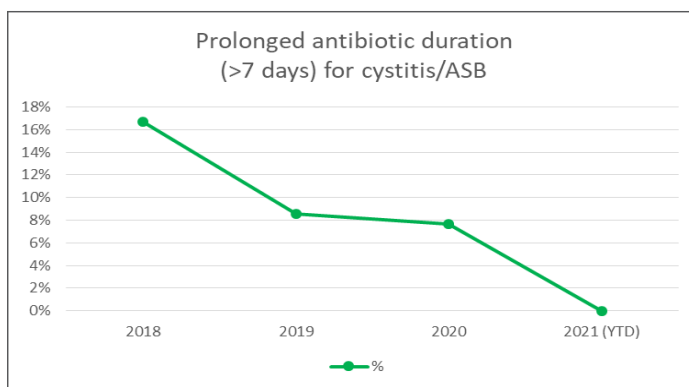
##### Reduced number of patients treated unnecessarily for ASB



##### Improved antibiotic selection for treatment of UTI and reduced fluoroquinolone exposure.



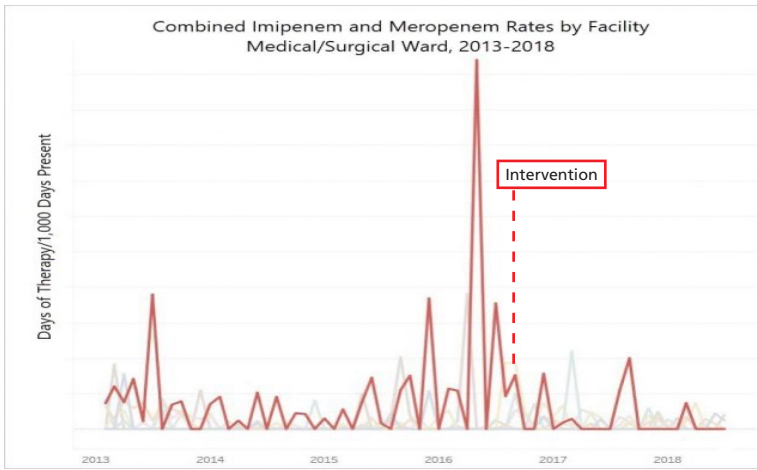
##### Reduced prolonged antibiotic durations for cystitis, reducing unnecessary exposure and improving adherence to national best-practices



#### 2. Using Telehealth to Decrease Carbapenem Use in a Critical Access Hospital

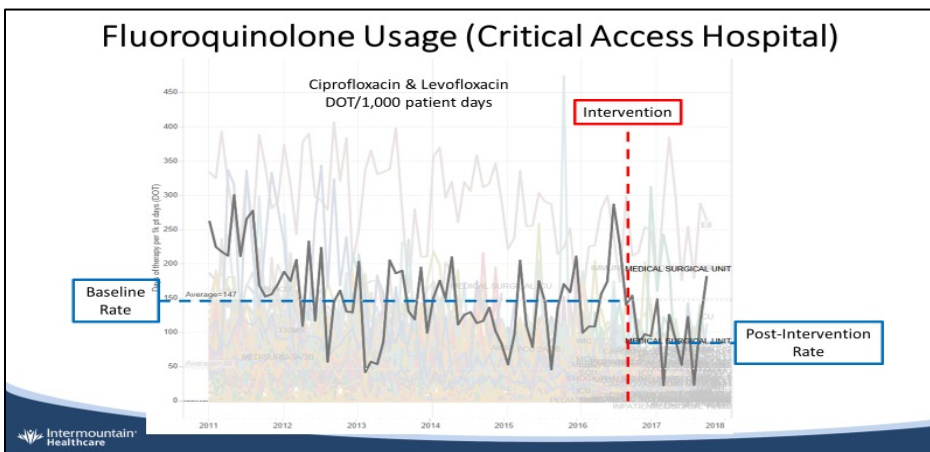
(Summarized from CDC's website: <https://www.cdc.gov/nhsn/au-case-examples/reducing-carbapenem-use.html>)

Using data from the CDC's National Healthcare Safety Network, the Intermountain Telehealth AS program identified a rural 20-bed hospital as an excessive user of carbapenems (imipenem and meropenem) compared to similar critical access hospitals. An ID telehealth pharmacist defined appropriateness criteria for carbapenem use, and empiric therapy was noted as a primary driver of inappropriate usage. The antibiogram was shared with prescribers to educate them on local resistance patterns and to help guide their prescribing of narrower spectrum empiric antimicrobial therapy. The pharmacist also began prospectively reviewing and intervening on meropenem orders. These interventions led to a significant reduction in carbapenem use.



### 3. Fluoroquinolone evaluation in a critical access hospital

Using data from the CDC’s National Healthcare Safety Network, the Intermountain Telehealth AS program identified a rural 20-bed hospital as an excessive user of fluoroquinolones (ciprofloxacin and levofloxacin) compared to similar critical access hospitals. A telehealth pharmacist defined appropriateness for common conditions for which fluoroquinolones might be used (pneumonia and urinary tract infection). Review of antibiotic prescribing data found that up to 25 percent of use was unnecessary, which accounted for more than 100 unnecessary days of fluoroquinolones in just six months. The antibiotic data was shared with prescribers along with recommendations for evidence-based prescribing. The intervention led to a significant reduction in fluoroquinolone use.



### KEY TAKE AWAY POINTS

- Intermountain Telehealth AS program can define appropriateness criteria and compare antibiotic use across facilities, allowing partners to identify low-hanging fruit for stewardship intervention.
- Partnering with Intermountain Telehealth provides access to ID resources and expertise, which can facilitate completion of quality improvement projects leading to significant improvements in antibiotic use, patient safety, and quality of care.