

2019

# Improving patient knowledge of antimicrobial resistance and appropriate antibiotic use in a Rutland county acute care center

Stephen D. Daniels  
*Larner COM at UVM*

Follow this and additional works at: <https://scholarworks.uvm.edu/fmclerk>



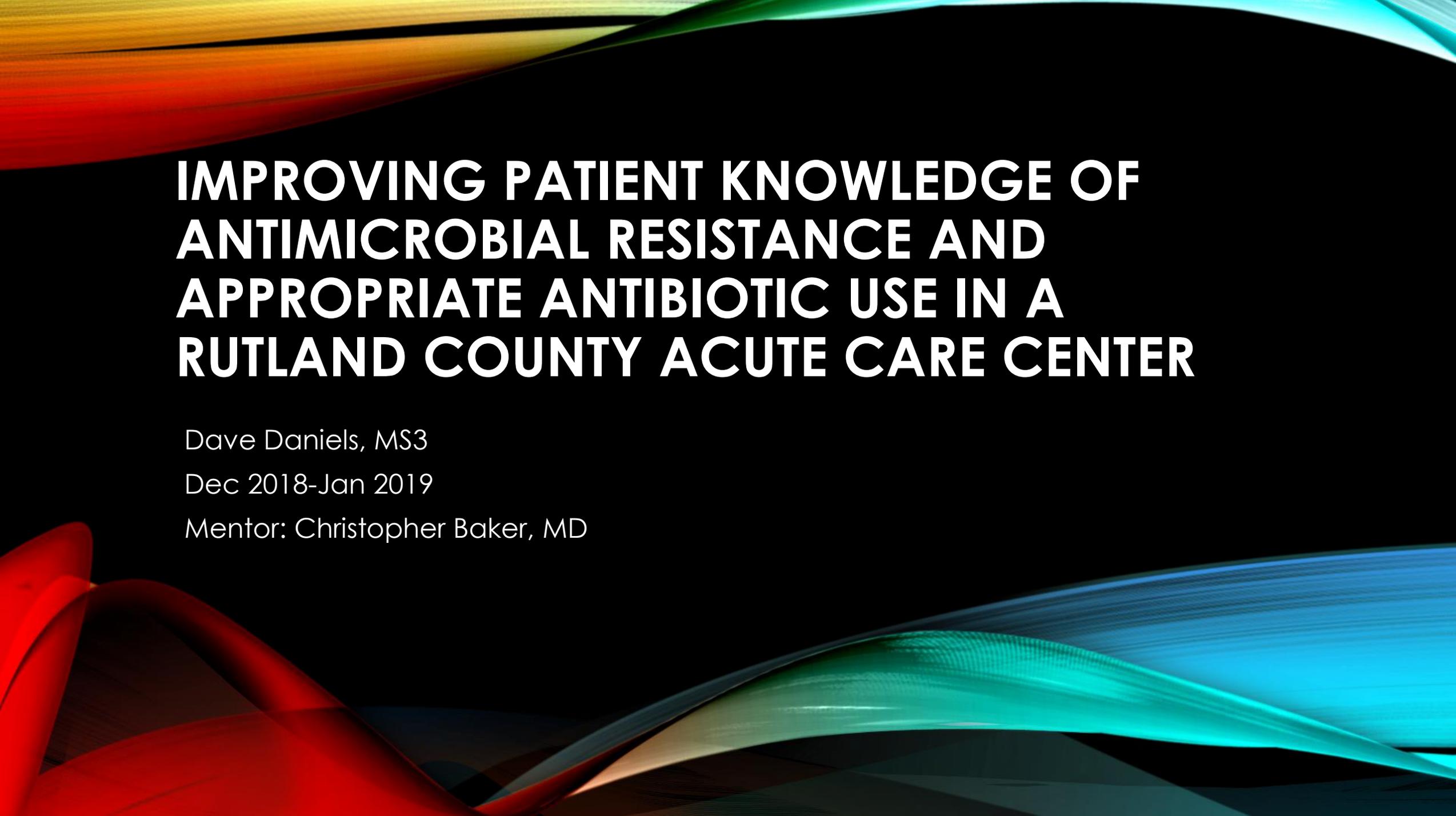
Part of the [Medical Education Commons](#), and the [Primary Care Commons](#)

---

## Recommended Citation

Daniels, Stephen D., "Improving patient knowledge of antimicrobial resistance and appropriate antibiotic use in a Rutland county acute care center" (2019). *Family Medicine Clerkship Student Projects*. 427.  
<https://scholarworks.uvm.edu/fmclerk/427>

This Book is brought to you for free and open access by the Larner College of Medicine at ScholarWorks @ UVM. It has been accepted for inclusion in Family Medicine Clerkship Student Projects by an authorized administrator of ScholarWorks @ UVM. For more information, please contact [donna.omalley@uvm.edu](mailto:donna.omalley@uvm.edu).



# **IMPROVING PATIENT KNOWLEDGE OF ANTIMICROBIAL RESISTANCE AND APPROPRIATE ANTIBIOTIC USE IN A RUTLAND COUNTY ACUTE CARE CENTER**

Dave Daniels, MS3

Dec 2018-Jan 2019

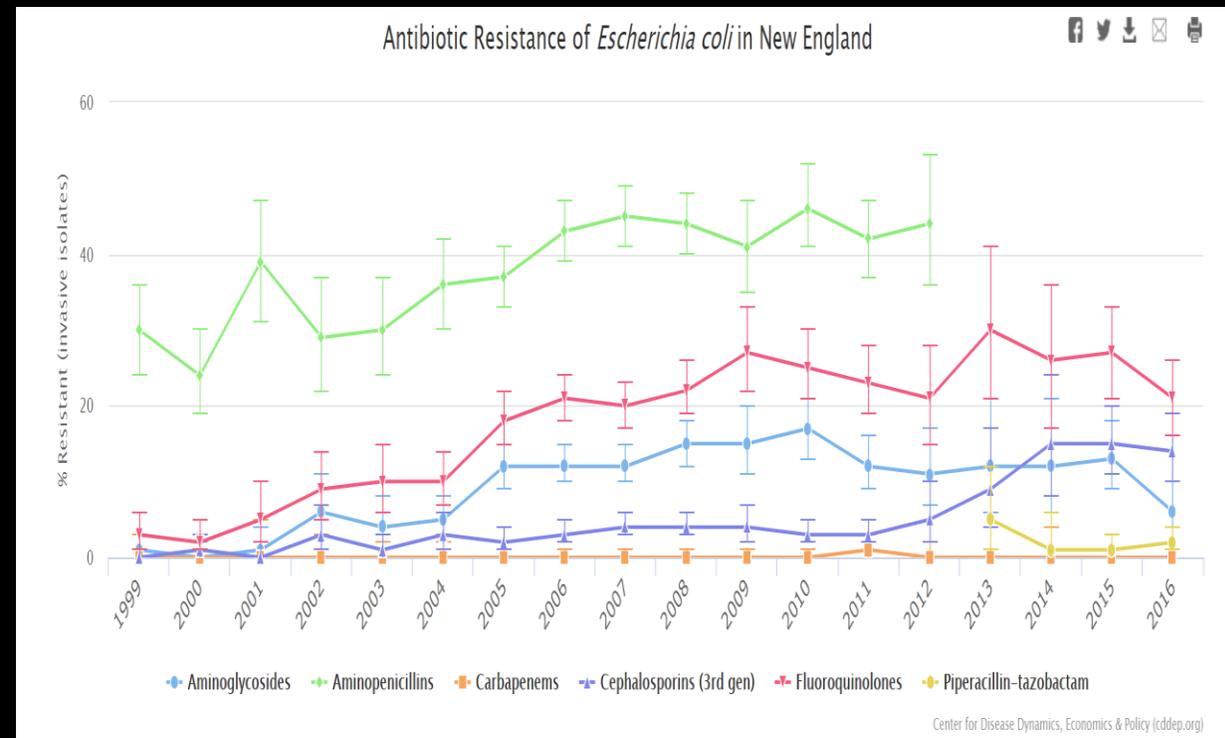
Mentor: Christopher Baker, MD

# ANTIBIOTIC RESISTANCE: THE BROAD CONCERN

- The CDC acknowledges antibiotic resistance as one of the most significant public health concerns of today, with ~2 million antibiotic resistant infections identified annually, resulting in ~23,000 deaths within the United States<sup>1</sup>
- Public misconceptions on appropriate antibiotic use contribute to the evolution of antibiotic resistance and growing healthcare costs. Public surveys on antibiotics have shown:
  - Only 30% of a surveyed group strongly agreed that antibiotic resistance was a significant problem; 30% from this same survey also endorsed antibiotics can kill viruses<sup>2</sup>
  - Results of a systematic review on general population surveys reported up to 34% of respondents did not know antibiotics could treat bacterial infections, 54% did not understand the ineffectiveness on viral infections, and 47% of subjects stop taking their prescribed antibiotics when he/she feels better<sup>3</sup>
  - Studies suggest that public campaigns on antibiotic awareness should be aimed at: discussing mechanism of resistance, properly educating on the role of antibiotics in acute illness, and individual responsibility for proper antibiotic use<sup>4,5</sup>
- Studies have demonstrated interventions to improve patient knowledge, attitudes, and behaviors regarding antibiotics affect the prescribing habits of clinicians<sup>6</sup>

# ANTIBIOTIC RESISTANCE: THE REGIONAL CONCERN

- The Vermont initiative, the Collaborative to Prevent Healthcare-Associated Infections and Antimicrobial Resistance (C-PHAR), is a statewide campaign aimed at addressing the issue of infection and antimicrobial resistance in Vermont by arming providers in many healthcare settings with the expertise to employ proper prescribing habits and provide education to the community in which they serve<sup>7</sup>
- Data trends show increasing microbial resistance in the NE region for many bacterial pathogens (graph depicted right)<sup>8</sup>
- Express Urgent Care at the Rutland Community Health Center sees hundreds of patients each month seeking treatment for common infections and is an optimal location for intervening to improve both education related to antibiotics and bacterial versus viral illness



# ECONOMIC BURDEN OF ANTIMICROBIAL RESISTANT INFECTIONS

- Throughout the United States:
  - Managing infections caused by antimicrobial resistant pathogens are estimated to reach ~\$30,000/patient, with up to a total economic burden of \$20 billion annually<sup>2</sup>
  - Costs from antibiotics resistant infections are related to direct costs such as increased length of hospitalization, utilization of second line antibiotics, and indirect/societal costs such as time lost from work etc...<sup>9</sup>
- In addition, providers at Express Care of Rutland note a significant burden of seeing a single patient multiple times throughout the duration of his/her illness, without ever prescribing an antibiotic
  - These return visits result in increased direct cost to the healthcare system, which could perhaps be improved if a more optimal educational approach were taken during the initial encounter, with the goal of reducing unnecessary return visits throughout a single illness

# COMMUNITY PERSPECTIVE

- Interview with acute care patient XX:
  - Q: What type of sickness do antibiotics treat?
  - A: If you are sick with a bug
  
  - Q: Is there any viral illness that can be treated with an antibiotic?
  - A: I am not sure, maybe one or two of them?
  
  - Q: If you were sick with a runny nose, cough, and sore throat, what do you think the best form of treatment would be: antibiotics or fluids and rest?
  - A: Well, if I were feeling really bad I mean, I would want to feel better as soon as possible, so I would probably want an antibiotic
  
  - Q: If you were given antibiotics for an infection, when would you stop taking them: immediately once you start feeling better? 1-2 days after you feel better? Or finish the entire bottle?
  - A: I don't like taking pills, so if I felt better, just to be sure I didn't get sick again, I would probably take it for a couple days after I feel better.
  
- While the patient in this interview demonstrated some knowledge regarding antibiotics and their use for treating bacterial ("bug") illness, it is evident that further education is necessary to provide the whole picture

# COMMUNITY PERSPECTIVE

“We are seeing the consequences of drug resistance all the time, most commonly in the drug-resistant strains of bugs we detect causing UTIs...there is an evident knowledge gap when it comes to the appropriate use of antibiotics. It is not uncommon for a patient to tell me he/she has been taking antibiotics that were laying around the house for recent onset of an illness that does not require antibiotic treatment. Moreover, I could almost guarantee that on any given day, a provider could identify several patients on their schedule they have seen for a 2<sup>nd</sup> or 3<sup>rd</sup> visit related to the same self-resolving illness, and never prescribe an antibiotic. There would certainly be significant benefit, reducing burden for both the patient and the system by having a means of improving our patients understanding of viral versus bacterial illness and the appropriate use of antibiotics.”

-PA-C, Express Care of Rutland Community Health Center

# INTERVENTION

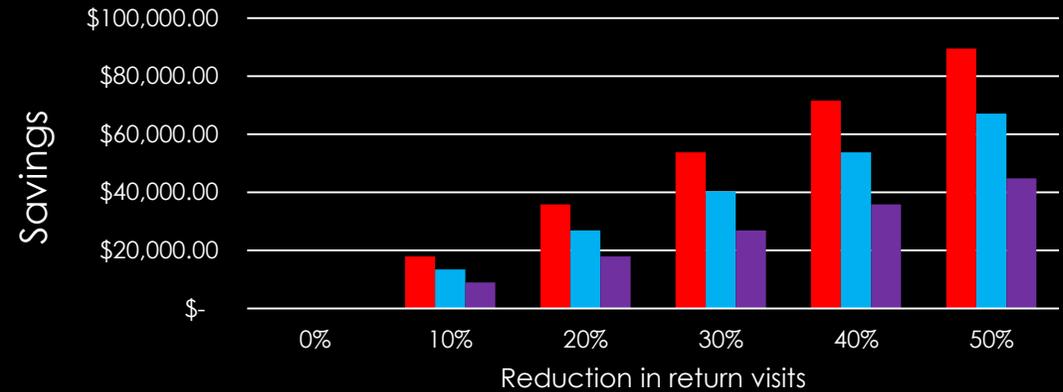
- A handout comparing bacterial and viral illness as well as antibiotic use and resistance was constructed and made available in both the Health Center waiting room as well as to providers to give patients and stimulate discussion regarding its content
- Using actual visit costs, a projection of the estimated savings from successful intervention was constructed following this model:
  - Provide comprehensive education on proper antibiotic utilization and illness care → reduce the number of unnecessary return visits → measure cost savings from strictly preventing the return visit (provided here) + savings from contributing to the overall reduction in antibiotic resistant infections (not measured here)

# Estimating cost savings at various return rates in patients with Medicaid

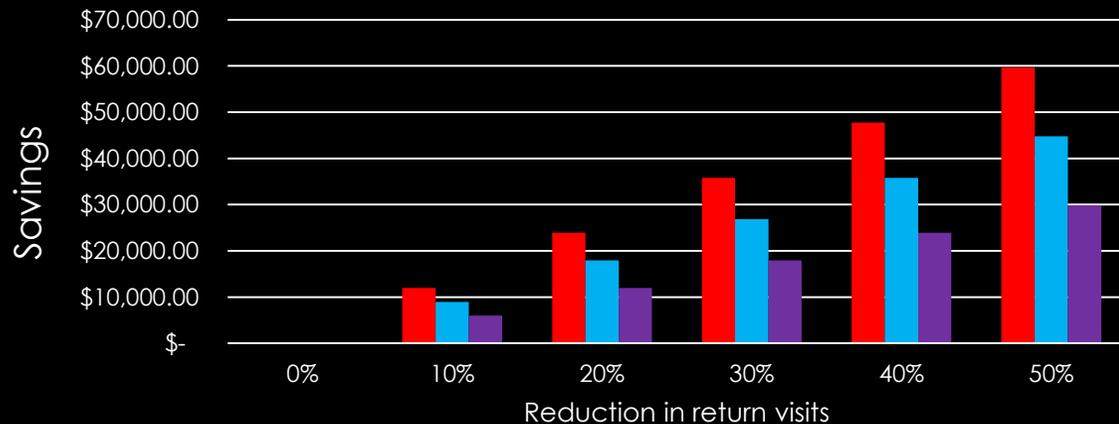
- How to interpret these graphs: If the average number of patients returning to clinic/week is ~ 14, and of those 14 patients, 50% of them are covered by Medicaid, then reducing the rate of return visits by 20% would result in an annual cost savings of ~\$12,000

Patients covered with Medicaid insurance  
■ 100% ■ 75% ■ 50%

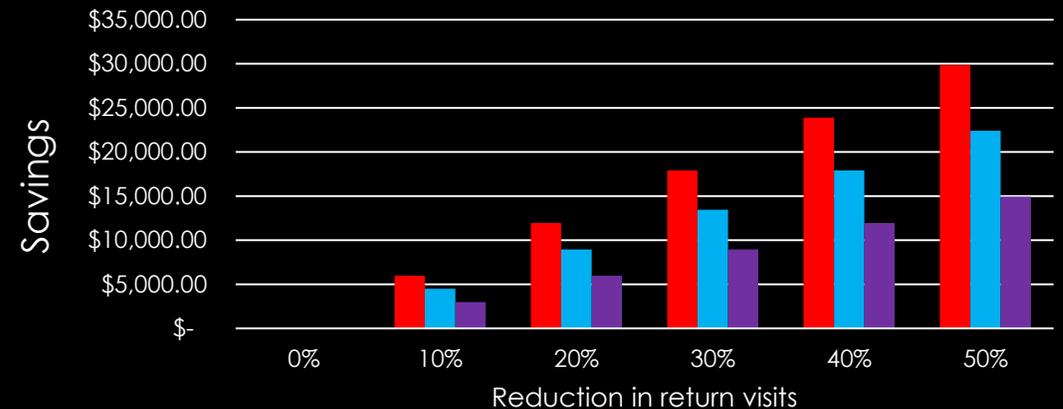
Projected Medicaid annual savings if base rate of return visit is 21 patients/week



Projected Medicaid annual savings if base rate of return visit is 14 patients/week



Projected Medicaid annual savings if base rate of return visit is 7 patients/week

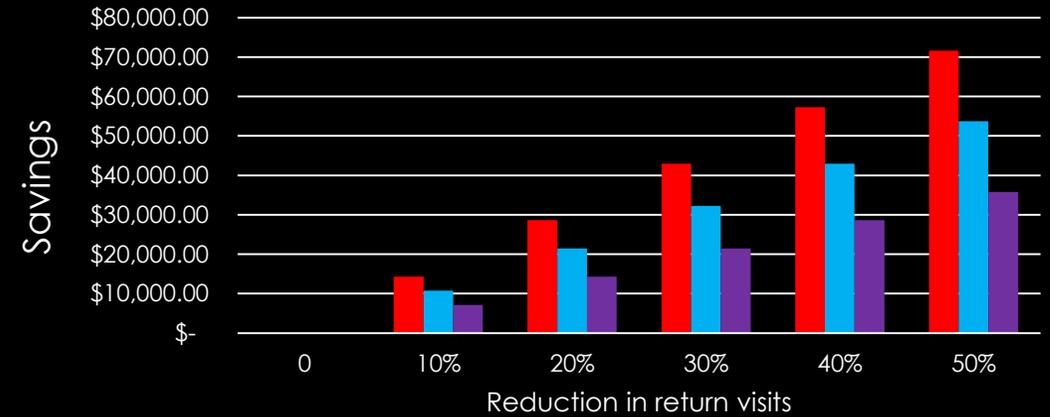


# Estimating cost savings at various return rates in patients with Medicare

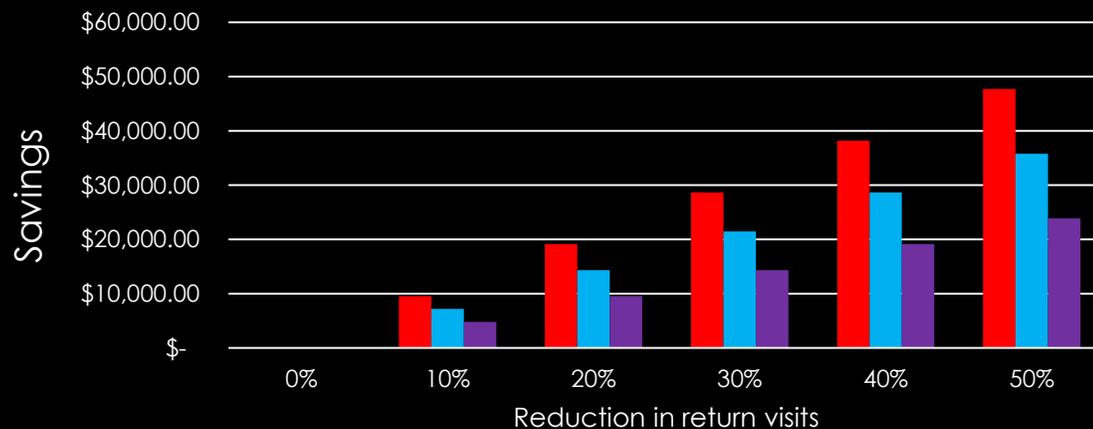
Patients covered with Medicare insurance

100% 75% 50%

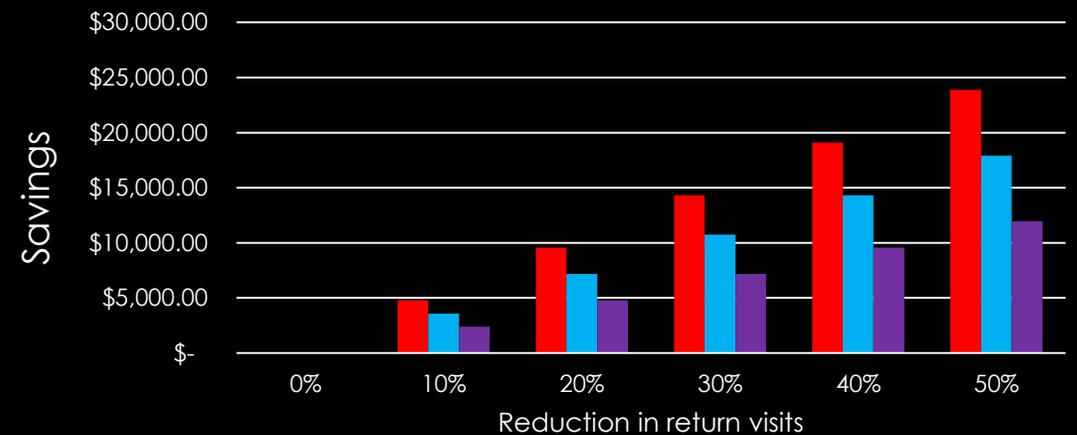
Projected Medicare annual savings if base rate of return visit is 21 patients/week



Projected Medicare annual savings if base rate of return visit is 14 patients/week



Projected Medicare annual savings if base rate of return visit is 7 patients/week



# OBSERVATIONS AND LIMITATIONS

- Having a readily available educational handout was much appreciated by the providers of Express Care, and well received by the patient population who in general felt the handout added to a more comprehensive clinical visit
- Notable limitations:
  - Observing the actual effects of this educational implementation would take far longer than the 6 weeks allotted for the clerkship, therefore the results provided are predictive based on real cost data provided by the billing department of the Community Health Center and empirical observation. The following assumptions should be considered when interpreting the data:
    - **The actual percentage of patients covered by Medicare or Medicaid was not known, therefore the estimated costs were derived assuming 100%, 75%, or 50% of the patients falling under Medicare or Medicaid coverage – the actual population is likely a combination of Medicare, Medicaid, and various other coverages**
    - **The number of return visits/week is based on empirical observations from the providers of Express Care – a more accurate estimation would require data collection from a much longer time period**

# FUTURE PROJECTS/INTERVENTIONS

- The data presented in this project is a projection of cost savings due to the time constraints of the clerkship. A study dedicated to determining the exact reduction in unnecessary return visits, applying more accurate billing data based off the patient's specific insurance coverage could enable a more accurate estimate indicating the financial effects of this educational intervention
- Assessing the global effect this intervention would have on the healthcare system would require a much more comprehensive undertaking, involving both the cost savings from reducing return visits, to trending the effects on antibiotic resistant infections over an extended time period, and the resulting reduction in cost of having to treat these infections

# REFERENCES

- CDC. Biggest Threats and Data | Antibiotic/Antimicrobial Resistance | CDC. [https://www.cdc.gov/drugresistance/biggest\\_threats.html?CDC\\_AA\\_refVal=https%3A%2F%2Fwww.cdc.gov%2Fdrugresistance%2Fthreat-report-2013%2Findex.html](https://www.cdc.gov/drugresistance/biggest_threats.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fdrugresistance%2Fthreat-report-2013%2Findex.html). Published 2013. Accessed December 27, 2018.
- Carter RR, Sun J, Jump RLP. A Survey and Analysis of the American Public's Perceptions and Knowledge About Antibiotic Resistance. *Open Forum Infect Dis*. 2016;3(3):ofw112. doi:10.1093/ofid/ofw112.
- Gualano MR, Gili R, Scaioli G, Bert F, Siliquini R. General population's knowledge and attitudes about antibiotics: a systematic review and meta-analysis. *Pharmacoepidemiol Drug Saf*. 2015;24(1):2-10. doi:10.1002/pds.3716.
- McCullough AR, Parekh S, Rathbone J, Del Mar CB, Hoffmann TC. A systematic review of the public's knowledge and beliefs about antibiotic resistance. *J Antimicrob Chemother*. 2016;71(1):27-33. doi:10.1093/jac/dkv310.
- Ancillotti M, Eriksson S, Veldwijk J, Nihlén Fahlquist J, Andersson DI, Godskesen T. Public awareness and individual responsibility needed for judicious use of antibiotics: a qualitative study of public beliefs and perceptions. *BMC Public Health*. 2018;18(1):1153. doi:10.1186/s12889-018-6047-8.
- Cross ELA, Tolfree R, Kipping R. Systematic review of public-targeted communication interventions to improve antibiotic use. *J Antimicrob Chemother*. 2016;72(4):dkw520. doi:10.1093/jac/dkw520.
- Vermont Department of Health. Collaborative to Prevent Healthcare-Associated Infections and Antimicrobial Resistance (C-PHAR) | Vermont Department of Health. <http://www.healthvermont.gov/immunizations-infectious-disease/health-care-associated-infections/mdro-collaborative>. Accessed January 16, 2019.
- Center for Disease Dynamics. ResistanceMap. <https://resistancemap.cddep.org/CountryPageSub.php?country=United+States>. Accessed January 16, 2019.
- Naylor NR, Atun R, Zhu N, et al. Estimating the burden of antimicrobial resistance: a systematic literature review. *Antimicrob Resist Infect Control*. 2018;7(1):58. doi:10.1186/s13756-018-0336-y.