DELAYED PRESCRIBING: PROMOTING ANTIBIOTIC STEWARDSHIP IN AN URGENT CARE SETTING

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ABSTRACT

Background: According to the Centers for Disease Control, (CDC, 2018) at least thirty percent of outpatient antibiotics are unnecessary. A retrospective 2018 study by Incze, M.A., Redberg, R.F. and Katz, M. found forty nine percent of antibiotic prescriptions in the urgent care setting were for inappropriate diagnosis. The aim of this study was to educate providers on one method of reducing antibiotic prescriptions and incorporate new patient instructions into the electronic health record. Participants included physicians associates and nurse practitioners.

Methods: The Quality improvement approach of *Plan Do Study Act* was utilized for this project. A literature review was completed to study methods of antibiotic stewardship. The electronic health record system was queried for delayed prescribing discharge instructions. Informal discussions among providers revealed absence of a cohesive approach to reducing unnecessary prescriptions for antibiotics.

Interventions: A PowerPoint was emailed to all providers on the use of delayed prescribing for antibiotics along with a Likert-Scale survey on provider perceptions of implementation. New instructions for patients on delayed prescribing of antibiotics was added to the existing electronic health record system. For a period of 30 days the number of times delayed prescribing instructions sheets were printed for patients was monitored along with the number of patients seen at each location. The provider survey was also reviewed.

Results: Provider survey demonstrated favorable attitudes toward antibiotic stewardship. The delayed prescribing instruction set was utilized twenty-seven times over the thirty-day period. There were 2,579 patient encounters during the study for a 0.9% utilization rate.

Conclusions: This was a new process in the clinic where the study was completed and though the utilization was low there was favorable consensus among providers on the value of antibiotic stewardship. There are many opportunities going forward including tracking diagnosis codes along with antibiotic prescriptions and following up to determine how many delayed prescriptions were filled. This research can provide a starting point for any outpatient facility looking to decrease rates of antibiotic prescribing.

Keywords: antibiotic stewardship, outpatient, urgent care, delayed prescribing

Definition of Terms

Antibiotic Stewardship: proper antibiotic selection and treatment duration to allow current antibiotics to remain effective and decrease antibiotic resistance (CDC,2021).

Health Care Provider: Any individual who is specially trained to diagnose and treat disease. This includes but is not limited to nurse practitioners, physician associates and physicians.

INTRODUCTION

Antimicrobial resistance seems a nebulous threat which will likely never cause real harm, similar to a pandemic. COVID-19 has proven these threats can come to fruition, and therefore, need to be addressed. Along with a worldwide pandemic, antibiotic resistance was named as one of the top ten threats to global health by the World Health Organization in 2019 (World Health Organization, 2019). The most concerning problems with antimicrobial resistance are the global impact, high financial and personal costs, and lack of new antibiotics in production. This issue has solutions which require commitments from both

healthcare and the general population.

Bacteria are amazingly durable and have been creating their own form of resistance long before antibiotics were developed. It is estimated bacteria have been developing resistance for both survival and extermination of competitors for the last 2.5 billion years. In 2016, researchers uncovered bacteria in an isolated cave at Carlsbad Caverns in New Mexico which were resistant to every antibiotic in production despite never having had human interaction (Spellburg, 2016). Antibiotic resistance is found in humans, crops and animals and it occurs globally. Worldwide resistance patterns of streptococcus pneumoniae, the most common cause of otitis media, to macrolide antibiotics range from 8-34%. Every antibiotic in existence today is linked to a worldwide resistance pattern by at least one bacterium (Center for Disease Dynamics Economics and Policy, 2020).

Data from the United States reveals a similar trend of antibiotic resistance (Center for Disease Dynamics Economics and Policy, 2020). When combined with high antibiotic prescribing rates, the US faces severe risks of sequelae related to antibiotic resistance. Each year

approximately 3 million Americans are infected with an antibiotic resistant organism and over 30,000 of them do not survive (Centers for Disease Control, 2020). The 2019 Antibiotic Resistance Threats Report from the CDC cites C. Difficile infections occurred in 228,000 people in the United States and resulted in over 12,000 deaths in 2017. These patterns extend to all regions with southern parts of the United States experiencing the highest resistance rates (Johnston, Thorpe, Jacob, & Murphy, 2019). The local antibiogram for the study site shows steady rise in e. coli resistance to multiple antibiotics over the course of the last fifteen years (Appendix A).

The cost burden is estimated at over 2 billion dollars annually in the United States (University of Minnesota, 2018). In a 2019 study, researchers performed a meta-analysis in which they calculated additional cost as an average of $1400 per infection. The authors noted a two-fold increase in resistant infections from 2002-2014, the authors attributed the increase to antibiotic overuse in both the inpatient and outpatient settings (Johnston, Thorpe, Jacob, & Murphy, 2019). The burden on patients is less often studied, but factors such as missed days of work, decreased productivity and expense of additional treatments should be included.

Further evidence of the seriousness of antibiotic resistance is the amount of resources appropriated by the federal government in the United States. In 2014 through an Executive Order, the CDC created the United States National Action Plan for Combating Antibiotic Resistant Bacteria (CARB). This plan was expanded on and awarded 160 million dollars of additional funding in 2020. Along with this funding came a new timeline and objectives to span over the next five years. An overview of the five tenets of this program include: slowing emergence of resistant bacteria, strengthen surveillance efforts, develop rapid detection test for

resistant bacteria, accelerate the development of new antibiotics and improve international collaboration on antibiotic resistance (Centers for Disease Control, 2020).

In 2019, the World Health Organization published a report on the state of antibiotic development. The outlook showed a scarcity of new antibiotics and those in development with little improvement over existing antibiotics. At the time of the report only fifty new antibiotics were in development and these were predominately reformulations or combinations of existing antibiotics. Cited in the report as primary reasons new formulations of antibiotics are lacking were difficulties in finding new binding sites on targeted bacteria, lack of specificity in testing for resistant organisms and unfavorable private sector funding. (World Health Organization, 2019).

Healthcare providers play a key role in combating antimicrobial resistance. The CDC has outlined an antibiotic stewardship guide which provides a formula to keeping antibiotics effective as long as possible. Education for patients and communities is a key component to preventing antibiotic resistance. Primary care providers are uniquely positioned to provide education to patients about appropriate use of antibiotics, methods to decrease spread of infections and vaccine education and promotion. Healthcare providers in turn, have a responsibility to be current on treatment guidelines, know how to screen for resistant infections and to use antibiotics judiciously (Centers for Disease Control, 2021).

LITERATURE REVIEW

Review of literature for this study began with a review of the recommendations from the CDC's report on the Core Elements of Outpatient Antibiotic Stewardship. The four main elements of this campaign are; commitment, action for policy and practice, tracking and reporting, education and expertise (Sanchez, Fleming-Dutra, Roberts, & Hicks, 2016). Of these, the report was further investigated for actions for practice, delayed prescribing was one of the methods identified in the report and became the focus of this study. The literature was reviewed utilizing EBSCO Host and the following databases; CINAHL Complete, Cochrane Registry of Systematic Review, Healthsource-Nursing/Academic Edition and MEDLINE complete. The keywords used were; Delayed Prescribing with "AND" modifier for Antibiotics. This search returned 163 results. Limits were added for peer-reviewed and articles within last seven years which returned 71 results. The literature was further narrowed to exclude and results which were commentaries, omitted delayed prescribing or were secondary or tertiary observations, after these 13 articles remained.

The literature was further reviewed for themes regarding delayed prescribing of antibiotics. The existing research demonstrated that delayed prescribing is effective in decreasing antibiotic use and much of the effectiveness is relying on the interactions between the patients and the prescribers. The majority of the existing research was done on upper respiratory infections as these account for a large percentage of antibiotic prescribing. These infections are often viral in nature and self -limiting in an otherwise healthy person and yet account for over fifty percent of the outpatient antibiotic prescription (De la Poza Abad, et al., 2016). The reviews included were global as this is a worldwide issue.

There exist an abundance of research demonstrating the effectiveness of delayed prescribing as a tool for decreasing inappropriate antibiotic use. Little et. al. 2014 studied four different delayed prescription strategies by reviewing symptom severity and duration. In the outpatient setting they demonstrated that no matter which method was used the rate of antibiotic use was decreased by forty percent. Little and his colleagues noted the only difference was patients who were given immediate antibiotic prescriptions demonstrated a higher belief in the effectiveness of antibiotics. Similar results were replicated by Moore et. al. 2017 in the DECARTES (Decision Rule for the Symptoms and Complications of Acute Red Throat in Everyday practice) prospective cohort study out of the UK. This study found similarities in symptom severity and relief in the delayed versus immediate anabatic prescribing groups and that delayed prescribing resulted in fewer overall Antibiotic prescriptions filled. In a Cochrane Systematic Review meta-analysis from the (Spurling, Del Mar, Dooley, Foxlee, & Farley, 2017) which included 11 studies and over 3000 participants the findings were again that delayed prescribing resulted in lower antibiotic use than immediate prescribing. This meta-analysis also demonstrated specifically for a diagnosis of cough that the clinical outcomes were identical for patients who received antibiotics versus those who did not. Findings were again replicated in this study out of Spain in which patients were given no antibiotic, delayed prescription, return for prescription or immediate antibiotic showed lowest antibiotic consumption with no prescription and second lowest consumption with delayed prescription (De la Poza Abad, et al., 2016). Ghebrehewet et. al. 2020 performed another study similar to De la Poza et. al. and again replicated the same results of delayed prescribing resulting in lower antibiotic consumption with similar clinical outcomes. One large cohort study out of the UK and Wales with 1.8 million chart reviews did demonstrate some contradictory findings with a higher percentage of patients

receiving delayed prescriptions experiencing complications which required hospitalization. Of note this finding varied across the age groups in the study. The authors of the study recommended a risk stratification process for patients who would receive delayed prescribing versus immediate prescribing for upper respiratory infections (Van Staa, et al., 2020). Overwhelming the evidence points towards delayed prescribing as a way to decrease overall antibiotic use with minimal risk for complications.

In the review of the literature there is research concerning parent and patient perceptions and experiences of delayed prescribing. A 2019 study with a cross sectional survey of 347 patrons at pharmacies demonstrated some respondents felt antibiotics would work on viral infections and that they were effective for the common cold. This shows an opportunity exist for public education about the role of antibiotic therapy (Seipel, Prohaska, Ruisinger, & Melton, 2019). In 2015 Mangione et. al. completed a cross sectional survey study in a pediatric setting in Seattle WA. In this study they surveyed providers in parents after children were seen with a diagnosis of upper respiratory infection. Their findings were the parents who had the highest satisfaction ratings had received instructions on treatment for symptoms for their child and discouragement from using antibiotic therapy for viral respiratory infections. When only antibiotics were discouraged the satisfaction scores were lower. These findings show an opportunity for education of the public on the role of antibiotic therapy and on symptom management for viral infections.

Provider perceptions and education also play a role in the use of delayed prescribing for antibiotics. In a 2016 study providers were more competent utilizing delayed prescribing after they had received communication skills for discussing this strategy with patience, electronic health record prompts and feedback on their prescribing habits (Vervloet, et al., 2016). Link et.

al. 2016 utilized provider training exclusively on delayed prescribing with pretest and posttest after 60-minute in person educational sessions. They then measured antibiotic prescribing rates the two months prior and two months post after the education. The study found significant decreases in antibiotic prescribing rates specifically for acute uncomplicated bronchitis. A 2016 qualitative study with semi-structured phone number use of 32 general practitioners revealed patterns of perception about delayed prescribing. The findings were request for more consistency in delayed prescribing strategies, increase in formal training on antibiotic stewardship and feedback to providers on prescribing habits (Ryves, et al., 2016).Another qualitative study out of Australia of primary care providers and pharmacists revealed further similarities on attitudes towards delayed prescribing. The providers in this study reported the use of delayed prescribing would be dependent upon the patient they were seeing and the patient stated expectations. The pharmacist echoed this sentiment stating they would fill a delayed prescription early if the patient insisted (Sargent, McCullough, Del Mar, & Lowe, 2017). A final qualitative study again out of Australia, which has a high antibiotic prescribing rate overall, involved primary care trainees and their supervisors. This study found that the supervisors use of delayed prescribing and attitudes towards impacted the trainees use of this method. These findings also uncovered the supervisory providers were better at-risk stratification in regards to which patients would be best suited for delayed prescribing (Dallas, et al., 2020).

The review of literature shows delayed prescribing is an effective strategy at decreasing overall antibiotic use. It is also multifactorial and has many players. The appropriate use is dependent on the severity of illness, the receptiveness of the patient, the approach of the provider and the reinforcement of the community pharmacist. There is great opportunity for additional research in this area.

METHODOLOGY

This project was conducted to measure the effectiveness of provider education to increase the utilization of delayed prescribing as a method of antibiotic stewardship. Providers were educated about delayed prescribing via a PowerPoint presentation and surveyed (Appendix C) on their perceptions of this intervention. The medical records of all patients were queried to uncover how often delayed prescribing was utilized after provider education.

Research design. This study was an evidenced based practice improvement project utilizing the plan-do-study-act model to see if a new practice of delayed prescribing of antibiotics would be utilized by advanced practice providers in an urgent care setting after they received education and new patient instructions (Appendix B) were added to the electronic health record system. In addition to an educational PowerPoint, which the providers self-reviewed, they also completed a short survey on their perceptions of antibiotic stewardship and delayed prescribing. A retrospective chart review was completed thirty days after provider training to see how often patients were given delayed prescribing instructions with their antibiotic prescription.

Population and Location. This project was completed at three urgent care settings in rural northwestern Pennsylvania. There were no exclusions for providers and seven chose to participate. Exclusions for retrospective chart review were patients who were seen for physical exams only.

Intervention, data collection and measurement. Providers at the three urgent care locations provided email addresses to receive the delayed prescribing educational PowerPoint presentation and Survey conducted on Survey Monkey. Upon completion of the PowerPoint and Survey by the providers new patient instructions were added to the existing list of discharge

instructions in the electronic health record. The patient instructions utilized were from the CDC's Antibiotic Stewardship for the Outpatient setting initiative (CDC, 2019). Reminder cards were also place at each provider's computer while the data was being collected. For thirty days after education was completed the patient records were reviewed and a tally was completed of how many times providers opted to chose the newly added delayed prescribing instructions for patients upon discharge. This number was divided by the total number of patients seen to determine a percentage of utilization.

Analysis. The provider surveys were evaluated to determine overall perceptions of delayed prescribing and likelihood for providers to utilize. The retrospective chart reviews provided data on frequency of use of the new patient instructions on delayed prescribing.

Ethical Considerations. This project was approved by IRB at Edinboro University. This study was exempt from individual consent as no identifying information for patients was collected and only the researcher had access to patient records. Deidentified data was housed on a secure laptop. One cause of concern was patients being advised not to take antibiotics when they were really necessary and could potentially delay needed treatment.

RESULTS

This project was conducted to survey provider perceptions of delayed prescribing and evaluate effectiveness of provider education in implementation of a new delayed prescribing process to increase antibiotic stewardship. The first objective was an evaluation of the providers knowledge and attitudes toward antibiotic stewardship and delayed prescribing. The second objective was to evaluate use of new patient discharge instructions in the retrospective review of the electronic health record after provider education was completed. The study included nine advanced practice providers and reviewed 2,579 electronic charts over a thirty-day period.

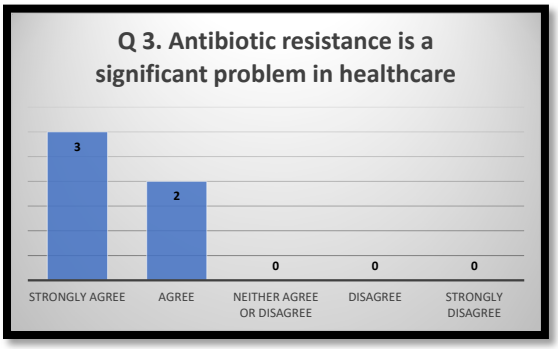
Description of Study Sample Characteristics

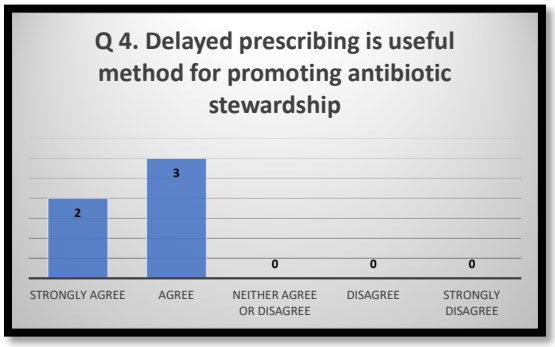
Among the nine advanced practice providers who agreed to participate were seven physician associates (PA's) and two were nurse practitioners NPs). The range of years of practice was three to seventeen. All participants practice in an urgent care group in rural Northwestern Pennsylvania with three locations. The retrospective chart reviews were completed over a thirty-day period from October to November of 2019. Patient visits for physical exams relating to CDL licenses, driver's licenses and school sports participation were eliminated from the reviews as these patients would not have been prescribed antibiotics.

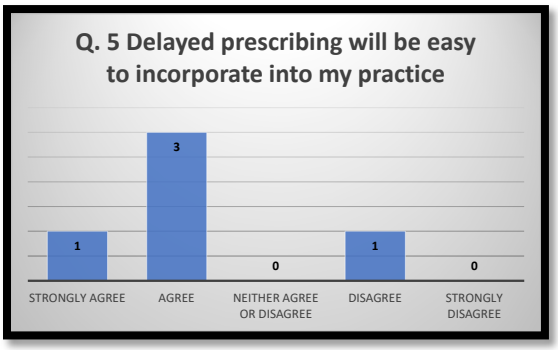
Research Questions

A. *What are provider perceptions of antibiotic stewardship?*
B. *Will providers choose to utilize delayed prescribing as an antibiotic stewardship strategy after education and addition of new patient discharge instructions in the electronic health record?*

A survey with multiple choice and Likert Scale items was included as a link at the end of the educational PowerPoint. Seven participants selected to view the survey and six opted to complete it. The survey consisted of six questions and the first was asked if they would participate in the survey to which six answered yes. Four participants reported currently using delayed prescribing in their practice for question number two. Questions three through six were Likert Style and detailed further overview of provider knowledge and attitude about delayed prescribing and are detailed in the graphs below. Survey results demonstrated participants were aware antibiotic resistance is a concern in healthcare and many currently practiced a form of delayed prescribing. There was a positive trend toward using delayed prescribing by the participants and most reported this method would be easy to incorporate.







The retrospective chart review focused on identifying which patients were provided delayed prescribing instruction upon discharge. Prior to this study the electronic health record was lacking formal delayed prescribing instructions. The data collected was limited to which charts contained the new delayed prescribing instructions. Over a thirty-day period 2,957 charts were reviewed for the three urgent care locations. Twenty-seven charts contained the new instructions on delayed prescribing for a rate of utilization of 0.9%.

DISCUSSION

This study was undertaken to evaluate provider perceptions of antibiotic stewardship using delayed prescribing, to give provider education on delayed prescribing, and add standardized patient instructions into the existing electronic health record. Prior to this project, antibiotic stewardship had not been formally discussed in this practice setting and there were no evidenced based, standardized patient instructions for use. Urgent Care Centers are desirable setting for antibiotic stewardship initiatives as many patients per year seek care for episodic illness at Urgent Care Centers.

Overall, the providers who agreed to be surveyed were aware of the need for antibiotic stewardship and viewed delayed prescribing as a favorable method for the treatment of mild, episodic illness which would be easy to implements. There was utilization of the new delayed prescribing instructions sheets over the thirty days of chart reviews. Prior to this project the electronic health record was lacking standardized, evidenced based instructions on delayed prescribing. This addition was completed at no cost and provided immediate impact for better antibiotic stewardship practices.

Limitations: This study's first limitation was the size. Nine participants were recruited and of those only five completed the survey. Future studies would be better served to include more participants from outpatient settings such as primary care offices, emergency rooms and other urgent care settings. A larger cohort would give additional perspectives for the survey too.

The second limitation was not analyzing provider and practice antibiotic prescribing trends before and after intervention. Improvements for further research studies would be to measure provider and practice antibiotic prescribing trends. Evaluation of practice antibiotic prescribing

rates ahead of time would allow the intervention to occur before a period of historically high rates of antibiotic prescribing Another beneficial measurement would be trending individual antibiotic prescribing habits before the intervention and after. This information should be shared with each provider with only their data identified and other provider's data de-identified but still provided for comparison. This data could include antibiotic prescribing habits regionally with diagnosis included. This would give providers insight into their antibiotic prescribing habits compared to their peers and would likely have more impact.

A third limitation was not including diagnosis and symptom data from the retrospective chart review. To increase the effectiveness of this study patient diagnosis and symptom severity and duration should have been included in the data. This would have allowed the researcher to see the most common diagnosis and symptoms associated with antibiotic prescribing. This should be shared with the participants as de-identified information to have increased impact on prescribing habits. This could also prompt a discussion of which diagnosis and symptoms are consistent with viral versus bacterial infections.

Oversight in failing to notifying local pharmacies of this study was the final limitation. Local pharmacist could have been made aware of this research study and supported the initiative when patients came to fill prescriptions. This intervention could also have included follow up with the patient pharmacy listed in the electronic health record to see how many delayed prescriptions were filled. Further follow up could have been completed with patients to see what prompted them to fill their prescription.

Implications for Further Research Antibiotic stewardship is an important area of research and initiatives to target prescribers is effective at increasing strategies to prevent

unnecessary antibiotic use. This is especially important in the outpatient setting. This study with the modifications identified in the limitations section would be easily replicated and have greater impact. A future study should include practice trends and be implemented prior to a historically high antibiotic use timeframe. It should provide data to the individual prescribers on their patterns of antibiotic use compared to their peers. Patient data collected should include diagnosis and duration along with severity of symptoms. A thorough review for the effectiveness of delayed prescribing interventions would include follow up on number of prescriptions filled. Finally, the data should be reviewed with the participants after completion of the study.

Conclusion Further studies with additional details need to be conducted on antibiotic stewardship strategies as this issue is only growing. The outpatient setting remains the ideal place to implement strategies to decrease antibiotic use as it is where most antibiotics are prescribed. By decreasing unnecessary antibiotic use we can realize a multitude of benefits including; maintain the effectiveness of our current antibiotics, decreasing adverse drug effects due to antibiotics and realize a cost savings by prevention of the adverse drug effects. This remains a very important initiative and it is multifaceted which provides many opportunities for research and education for both prescribers of antibiotics and the patients who take them.

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Appendix A

Local Hospital Antibiogram

15-year Susceptibility Patterns
(numbers are % susceptible)

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Staphylococcus aureus															
Oxacillin	61	54	58	60	64	61	60	58	64	65	65	80	69	65	65
MRSA	39	46	42	40	36	39	40	42	36	35	35	20	31	35	35
Staphylococcus epidermidis															
Oxacillin	-	24	37	37	33	31	42	44	44	29	43	42	46	39	38
Streptococcus pneumoniae															
Penicillin G	61	60	55	68	68	71	63	74	65	66	64	67	57	66	67
Erythromycin	27	70	60	69	60	62	69	65	71	62	46	56	59	52	41
Ceftriaxone	94	100	100	94	*	93	95	95	86	98	97	94	89	93	100
Levofloxacin	-	99	99	100	100	98	100	100	100	95	100	100	100	98	96
Enterococcus faecium															
Vancomycin	33	18	51	53	36	28	32	32	23	18	22	41	50	40	45
Escherichia coli															
Ampicillin	68	64	61	57	58	57	58	58	56	56	59	59	60	59	58
Ampicillin/sulbactam	67	69	68	66	66	69	69	69	66	66	66	66	65	65	65
Piperacillin/tazobactam	96	100	100	99	99	98	98		96	97	98	97	98	97	98
Imipenem/cilastatin		100	100	100	100	100	99	100	100	100	100	100	100	100	100
Cefazolin	71	95	92	90	90	91	91	91	92	89	89	88	88	88	89
Ceftriaxone	99	99	97	97	97	97	97	97	97	94	94	94	94	94	95
Ciprofloxacin	90	87	82	77	80	79	80	80	80	79	75	81	81	82	83
Levofloxacin	90	87	83	77	-	-	-	-	-	-	-	81	81	82	83
Gentamicin	96	93	93	91	91	90	92	92	92	93	94	94	95	94	95
Tobramycin	-	94	94	93	95	93	93	93	93	92	94	93	94	94	95
SMX/TMP	88	86	84	80	82	80	80	80	79	78	79	80	82	81	84
Nitrofurantoin	98	96	95	94	94	95	96	96	93	91	94	96	96	96	96
Pseudomonas aeruginosa															
Ceftazidime	79	80	81	89	89	90	93	93	92	93	92	94	95	95	95
Cefepime	-	-	-	-	74	87	93	-	92	91	92	95	96	93	94
Ticarcillin/clavulanate	71	*	-	-	-	-	-	-	-	-	-	-	10	20	42
Piperacillin/tazobactam	87	94	96	98	98	92	95	~	98	99	98	99	100	100	100
Imipenem/cilastatin	86	81	85	93	98	89	88	88	83	80	86	89	92	89	84
Ciprofloxacin	65	68	65	66	66	81	71	71	81	77	68	84	79	87	82
Levofloxacin	63	69	67	67	67	77	*	*	*	73	68	81	76	84	78

Appendix B

Delayed Prescribing Patient Instructions

What is Delayed Prescribing?

WAIT. DO NOT FILL YOUR PRESCRIPTION JUST YET.

Your healthcare professional believes your illness may resolve on its own.

First, follow your healthcare professional's recommendations to help you feel better without antibiotics. Continue to monitor your symptoms over the next few days.

- Rest.
- Drink extra water and fluids.
- Use a cool mist vaporizer or saline nasal spray to relieve congestion.
- For sore throat in adults and older children, try ice chips, sore throat spray or lozenges.
- Use honey to relieve cough. Do not give honey to infants younger than 1 year.

If you **do not feel better in _____ days / hours or feel worse,** go ahead and fill your prescription.

If you **feel better, you do not need the antibiotic,** and do not have to risk the side effects.

Waiting to see if you really need an antibiotic can help you take antibiotics only when needed. When antibiotics aren't needed, they won't help you and the side effects could still hurt you. Common side effects of antibiotics can include rash, dizziness, nausea, diarrhea and yeast infections.

Antibiotics save lives, and when a patient needs antibiotics, the benefits outweigh the risks of side effects. You can protect yourself and others by learning when antibiotics are and are not needed.

To learn more about antibiotic prescribing and use, visit www.cdc.gov/antibiotic-use.

CDC, 2018

Appendix C

Provider Survey Questions

Survey Post Education

Survey Post Education

1. Will you participate in this survey?

2. Do you currently use delayed prescribing for antibiotics in your practice?

For the following please rank:

1=strongly disagree

2=disagree

3=neutral

4=agree

5=strongly agree

3. Antibiotic resistance is a significant problem in healthcare

4. Delayed prescribing is useful method for promoting antibiotic stewardship

5. Delayed prescribing will be easy to incorporate into my practice

6. I will be incorporating delayed prescribing into my practice.