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Computer Integrated Surgery II

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<center>Clinical Decision Support System Adoption and Acceptance</center>

According to the Centers for Disease Control and Prevention, "up to 50% of all the

antibiotics prescribed for people are not needed or are not optimally effective as prescribed."[1]

This overuse of antibiotics is a dangerous issue facing healthcare in the United States and other

countries around the world. It leads to antibiotic resistance, meaning that the usual treatments

for infections are no longer effective, and alternative treatments must be used. These alternative

treatments are often more expensive, less effective, and result in a greater cost to the patient.[1] To

address this issue, Antimicrobial Stewardship Programs (ASPs) have been created to assist

healthcare providers by standardizing the prescription of antibiotics.[3] One of methods by which

ASPs achieve this is through Clinical Decision Support Systems (CDSSs), which are often

computerized and use software to aid in clinical decision making. However, studies show that

the adoption of CDSSs in hospitals has been surprisingly low considering that they are shown to

improve clinicians' performance.[2] Even more concerning is that clinicians, despite using a

clinical decision support system, override or ignore the support over half of the time.[2] The

papers in this literature investigation seek to determine factors that will aid in the adoption of

CDSSs and the acceptance of the support that they generate.

In *The Role of Perceptions of Clinicians in Their Adoption of a Web-based Antibiotic

Approval System: Do Perceptions Translate into Actions?,* Zaidi et. al. investigated the

relationship between clinicians' perception of ease of use and usefulness and adoption of the system. They achieved this by surveying senior and junior medical staff and pharmacists at The Royal Melbourne Hospital in Melbourne, Australia who had the option of using an electronic antibiotic approval program called iApprove. The survey collected information about the participants' computer usage, including weekly time spent, self-rated sophistication, and whether they used a computer for specific tasks, the perceived ease of use of iApprove, including tasks like logging into or out of the system, obtaining approvals, and using within their daily workflow, and the usefulness of iApprove, including increasing knowledge and improving documentation practices. In addition, the researchers obtained information about the number of doctors and approvals that were generated by iApprove during the study period. To analyze the data, means, medians, and percentages of scaled categories were calculated, and Spearman's rho technique was used to study the correlations between variables. The researchers found that the number of years of experience was negatively correlated with the number of approvals, meaning that the older clinicians were using the iApprove system less frequently than their younger counterparts. Unsurprisingly, they also found that self-rated computer sophistication and computer use for other diagnostic reasons positively correlated with use of the system. No significant correlation was found between the number of estimated hours clinicians spent using computers and their use of iApprove. In terms of perception, they found that clinicians were more likely to use the system if they perceived it to be easy to learn, easy to show others, and fit naturally into their daily workflow. These results allow administrators and developers to implement functionality that will aid in the adoption of a CDSS by increasing its perceived ease of use and usefulness. For example, ensuring that login and logout procedures are intuitive and

instructions and further information about the evidence-based recommendation process are readily available. However, it would be helpful to know what specific features of iApprove contributed to the high ratings found in this study. In addition, this study is limited to one CDSS in one hospital, so more widespread information about ways to increase the perceived ease of use and usefulness would be helpful.

In *A Survey of Factors Affecting Clinician Acceptance of Clinical Decision Support,* Sittig et. al. investigated factors that affect the acceptance of clinical decision support by clinicians. The researchers hypothesized that factors leading to rejection of support could be grouped according to patient, providers, alert, or environment. They achieved this by conducting a survey of all adult primary care physicians within the Health Maintenance Organization group in the northwestern United States. The survey asked questions pertaining to the four potential factors: patient, providers, alert, or environment, which were responded to on a frequency scale (from 1 = "Never" to 5 = "Always"), likelihood scale ("More," "Less," or "Equally" likely), or open ended response. To analyze the data, the researchers calculated the mean, standard deviation, and range of responses for each scaled response, and encoded and tabulated the results of the open ended responses. The researchers found several significant differences between the responses by gender and age of physicians, but the most relevant findings were those due to environmental factors. Eighty-four percent of physicians indicated that they were often twenty minutes behind schedule, and that when they were behind schedule, 80% of physicians they reported that they were less likely to accept clinical decision support. Other relevant findings were that approximately one third of physicians were more likely to accept clinical decision support for patients who were elderly and for patients who had more than five medications or

chronic conditions. These factors are not within a hospital administrator or CDSS developer's control, but it is interesting to note that clinical decision support is more accepted for higher risk patients like the elderly or those with chronic conditions. These results offer several key takeaways for administrators or developers hoping to launch an effective CDSS. First, the CDSS must be efficient, in other words, it must be fast and easy to access the CDSS and to enter all of the information required to receive support. In addition, factors that contribute to high risk patients should be collected if applicable, since the results from this study indicate that physicians are more likely to accept decision support for those patients. Although this study offered several beneficial takeaways, it is limited by the relatively small number of physicians that responded to the survey. In addition, the results were qualitative and subjective. It would be beneficial to investigate the introduction of different types of clinical decision support into the workflow and its effect on the objective measure of how much support the clinician accepts.

These papers have identified qualities of a CDSS that is either adopted into the clinical workflow or generates support that is accepted by the physician. From Zaidi et. al.'s investigation, important qualities for adoption success are perceived ease of use and useful of a CDSS. These qualities can be achieved by creating intuitive login and logout procedures and providing easy to access information about the evidence-based recommendation process. From Sittig et. al.'s investigation, important qualities for a high acceptance rate of support are a highly efficient CDSS that is able to incorporate factors for high risk patients. By implementing these simple features, the effectiveness of CDSSs can be increased. Specifically, the prescription of antibiotics can be standardized in order to provide better healthcare to patients and decrease the unnecessary prescription of antibiotics in the United States and around the world.

Works Cited

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