Health

مؤسسة الإمارات للخدمات الصحية
Emirates Health Services

The Power of Applied Evidence at the Point of Care: The Utilization of Evidence-based Order Sets and Care Plans to Support Clinical Decision Making

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Healthcare organizations are currently confronted with a host of significant challenges, including rising costs, workforce shortages, staff retention and the pressing need to minimize variability in order to foster a culture of safety. Amidst these circumstances, the importance of enhancing the quality of care cannot be overstated. For healthcare organizations to address these issues effectively, Clinical Decision Support (CDS) systems have the potential to help improve patient outcomes and reduce clinician burnout.

The implementation of CDS solutions at the bedside aids the standardization of care and facilitates evidence-based decision-making. As a result, such systems have the potential to improve quality of care, patient safety, and reduce costs, with research demonstrating this positive impact in real-world clinical settings.[1,2,3]

It is in this context that the Emirates Health Services (EHS) recognized the role CDS solutions can play in addressing these issues. The aim for EHS was to reduce practice variability across its hospital facilities and ensure that its healthcare professionals (HCPs) had the support of evidence-based tools. By leveraging CDS solutions, EHS sought to enhance its care practices, foster alignment with established evidence-based guidelines and promote optimal patient outcomes. Additionally, EHS wanted to improve the intelligence of its Wareed Electronic Health Record (EHR) system. By implementing these tools, EHS aimed to optimize efficiency and streamline workflows.

To achieve its objectives, EHS decided to utilize Elsevier's evidence-based Order Sets and Care Planning as exemplary tools that could support physicians and nurses in their decision-making and patient care. Order Sets and Care Planning were successfully implemented at EHS across 16 of its inpatient facilities, which played a pivotal role in standardizing care practices and facilitating evidence-based decision-making at the point of care.

This case study highlights the value of Elsevier's evidence-based Order Sets and Care Planning solutions brought to EHS between September 2020 and October 2022. Importantly, this is the first time Elsevier has had access to a comprehensive dataset from an EHR, which enabled an analysis of real-world Order Sets and Care Plans utilization. **Below, see how EHS found time-saving benefits, increased efficiency, and the establishment of standardized, high-quality care.**

SAVING TIME AND IMPROVING THE QUALITY OF CARE WITH EVIDENCE-BASED ORDER SETS AND CARE PLANS

CDS solutions help provide a structured approach to patient care and guide clinicians with the latest evidence-based content at various stages of a patient's health journey.

Healthcare organizations invest a significant amount of time and effort in creating and maintaining tools such as order sets. With this in mind, EHS made the strategic decision to implement Elsevier's evidence-based Order Sets and Care Planning in its inpatient facilities. By connecting Elsevier's cloud-based content management tool with EHS' Wareed EHR system through bidirectional integration, EHS subject matter experts were able to customize sets of orders and provide contextual guidance whenever necessary. This enabled EHS to implement their customized version of evidence-based Order Sets, known as EBM (Evidence-Based Medicine) Order Sets, incorporating the latest research, guidelines, and best practices. As a result, EHS empowered its clinicians to deliver optimal care to their patients by providing a tool that helped improve ordering efficiency, reducing clinician time and burnout and offering evidence-based guidance for more informed decisions.

METHODS

After implementing evidence-based Order Sets, EHS sought to evaluate their impact by addressing two key questions:

1. Do the evidence-based Order Sets help physicians become more efficient when placing orders?

2. Do physicians demonstrate increased compliance with EHS-approved standards when utilizing the evidence-based Order Sets?

To answer these questions, EHS decided to focus their analysis on the admission process. This choice was made because all patients must go through this process, which is a critical moment for placing numerous orders that significantly impact timing and care provision.

The analysis focused on the admission process for its pediatric patient population. We examined data from a two-year period between September 2020 and September 2022 that included over 1 million unique encounters and 144,000 unique inpatient admissions across 16 facilities.

For orders-based analyses, we focused on selected pediatric admission order sets. Patients for whom the "Admit to Pediatric Ward" or the "Admit to Pediatric ICU" were utilized are referred to as "cases" in this context and those patients who were admitted without these specific order sets are referred to as "controls". Controls were selected to be as similar to cases as possible.

Both cases and controls shared the following characteristics:

- Admitted to hospital and had at least one documented nursing unit
- Discharged "with approval" (patients who left against medical advice or suffered a fatal inpatient event were excluded)
- Admission occurred after November 2020
- Had a length of stay (LOS) > 1 day
- Patients with a diagnosis code for Cancer, End-Stage Renal Disease or Respiratory Distress Syndrome were excluded

The number of times (i.e. ordering instances) a physician has to enter the ordering system to add orders is a key factor in understanding workflow efficiency. EHR data does not directly indicate the beginning and end of an order entry session (i.e. ordering instance). To gain insight into this important aspect of the physician workflow, we therefore had to infer an ordering session from individual order timestamp information. Typically, during an ordering instance multiple orders are entered and signed off at the same time resulting in time stamps for the individual orders that are milliseconds apart. Distinct ordering instances were assumed to occur when there were more than 2 minutes separating individual orders. The 2-minute threshold was selected after examining order timestamps for randomly selected patients who were admitted to the Pediatric Ward or the Admit to Pediatric ICU. Because orders signed off at the same time receive timestamps within milliseconds of each other, a 2-minute gap would therefore only likely occur with separate ordering instances. The control group were those pediatric patients of similar age distribution who were admitted to the hospital but did not receive an order set during the same time period.

> In exploratory analyses seeking to understand the utility of individual order set elements, we examined the individual orders within the selected order sets, determined the frequency of use of each element and identified any elements that had never been used. We also identified single orders that were not included in the order set but were commonly ordered independently.
>
> For Care Planning analyses we used the timestamp of admission compared to the timestamp of care plan initiation to determine compliance with the 24-hour window.

RESULTS

The data from the adoption period revealed that physicians who utilized the evidence based "Admit to Pediatric Ward" Order Sets had a lower number of ordering instances. The analysis showed a 0.5 reduction in the number of ordering instances.

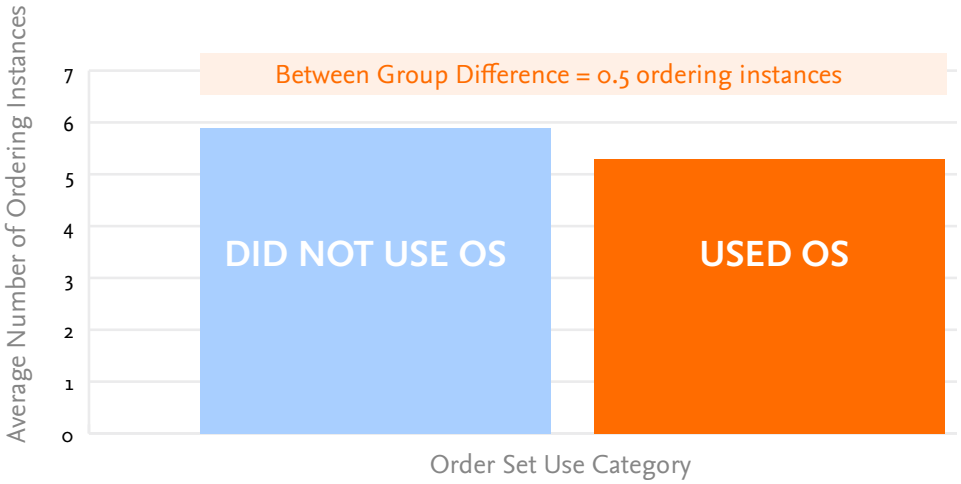

Figure 1: Unadjusted average numbers of order sessions for encounters with/ without Pediatric Admit Order Set

We conducted a sensitivity analysis assuming a range of typical ordering session durations of 10, 15 and 20 minutes. From this we extrapolated the potential impact of 0.5 instances time savings for the 10,730 control admissions. For the most conservative estimate (10-minute sessions), reducing the average number ordering instances by 0.5, we estimate a that approximately 894 hours of physicians' time could potentially be saved if all physicians opted to use the "Admit to" Order Sets when admitting their patients.

Benefit of use of this evidence-based Order Set was confirmed by an EHS Ophthalmologist, ***"Order sets would be an effective way to reduce human errors as possible. It really saves time, because nowadays you have a lot of documentation. The more you use Order Sets, I believe that it will be much easier for us to deliver practice."***

The analysis also presented compelling evidence that physicians who utilized the evidence-based Order Sets demonstrated a higher level of compliance with EHS-approved standards compared to those who did not, as shown in Figure 2. This increased compliance was particularly prominent in the following five key categories of orders: Patient Care, Nutrition & Dietetic Services, Laboratory, Pharmacy and Admit/Transfer/Discharge. (shown in grey box)

Additionally, the utilization of evidence-based Order Sets by EHS physicians resulted in a higher capture rate of critical order category types and "Pediatric Ward" Order Sets exhibited higher compliance rates when placing necessary admission orders as shown in Figure 2. These findings highlight the significance of integrating evidence-based practices into clinical workflows and emphasize the positive impact of leveraging evidence-based Order Sets on adherence to standards and the overall quality of patient care.

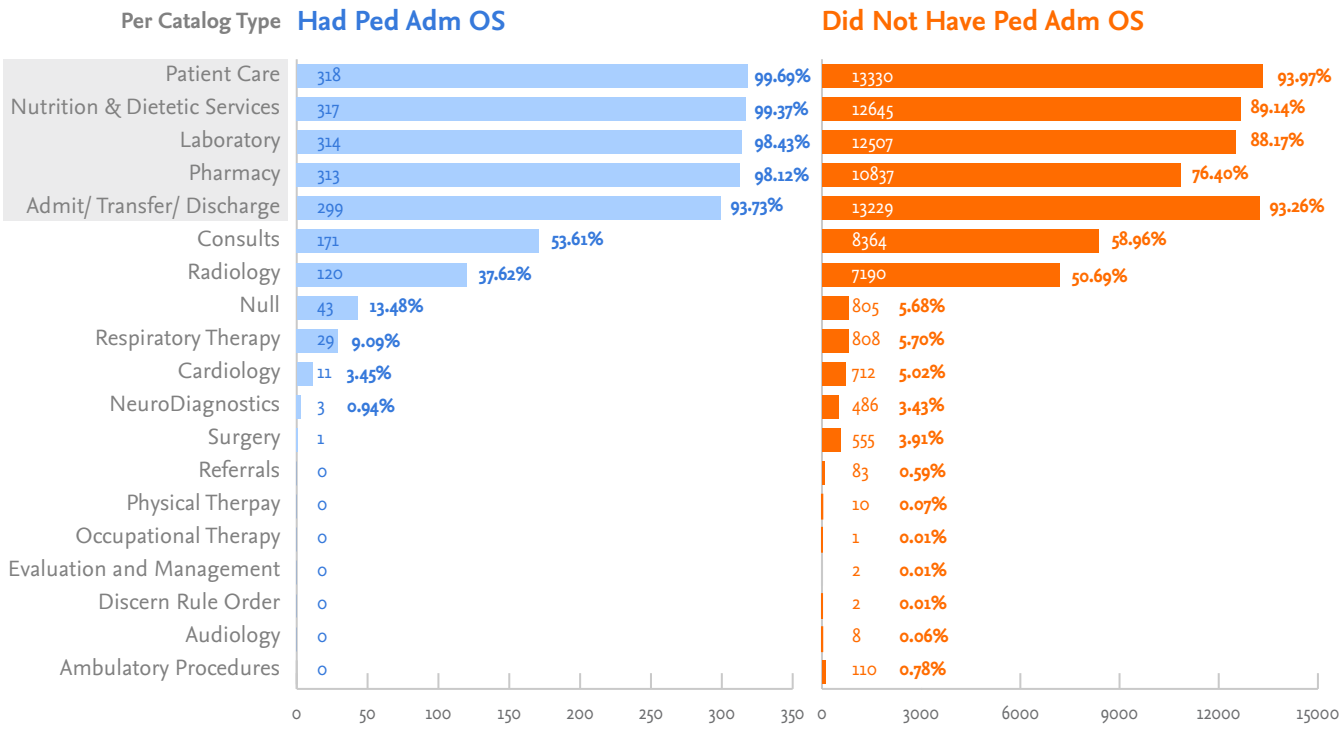

Figure 2: The 5 critical order category types located in the red box were more commonly captured when Pediatric Admit Order Sets (Ped Adm OS) were used.

By enabling physicians to place the required orders more promptly and comprehensively, it is presumed that the use of evidence-based Order Sets translated into time savings for nurses, who were no longer required to call doctors to request orders, thereby avoiding delays in providing care. For physicians, this had the potential to decrease the time they spent rectifying missing essential categories. By doing so, it offered the opportunity to minimize potential safety and quality implications.

Moreover, the analysis conducted at EHS demonstrated that the utilization of evidence-based Order Sets encompassed all ordering categories, ensuring comprehensive coverage. Over a 12-month period, 82% of orders within the "Admit to Pediatric" Order Set were selected at least once, indicating an elevated level of completeness and suitability of the evidence-based Order Sets. This finding highlights the effectiveness of the evidence-based Order Sets in capturing the necessary orders and supporting the admission process for pediatric patients.

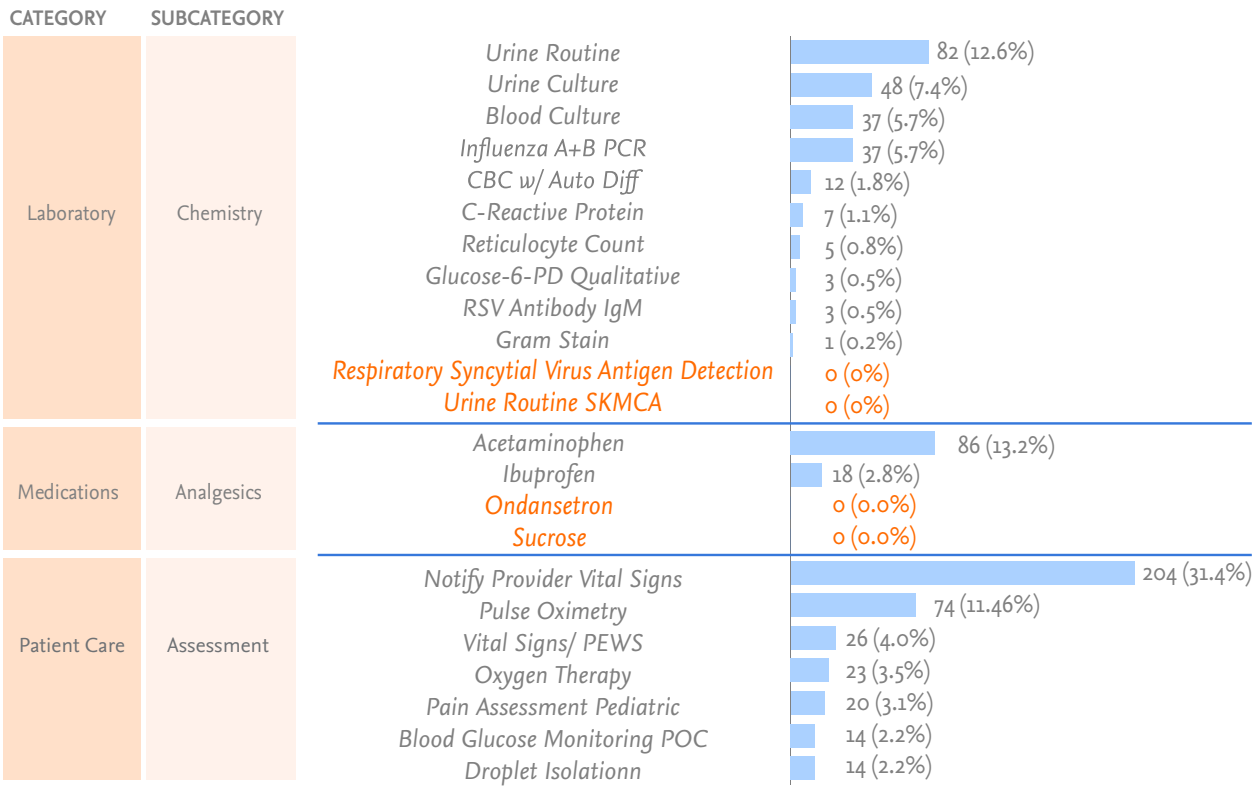

Figure 3: All admission categories were represented with Order Sets

The utilization of these evidence-based Order Sets witnessed adoption growth during this period, indicating the user-friendly nature of these sets and the inclination of physicians to choose evidence-based Order Sets over their previously personalized ones as shown in Figure 4.

Feedback from clinicians confirmed the time-saving benefits of these evidence-based Order Sets which enabled them to deliver care, ***"Before using Elsevier's Order Sets it used to take double or triple time to place orders manually. Now it takes less than 5 minutes to finish everything. Less stress, less agitation with just a click."*** EHS Surgeon.

At this facility, there was a conscious choice to use the "Admit to Pediatric" Order Sets and its use by physicians doubled, which may indicate a good level of trust in the evidence-based content of this solution.

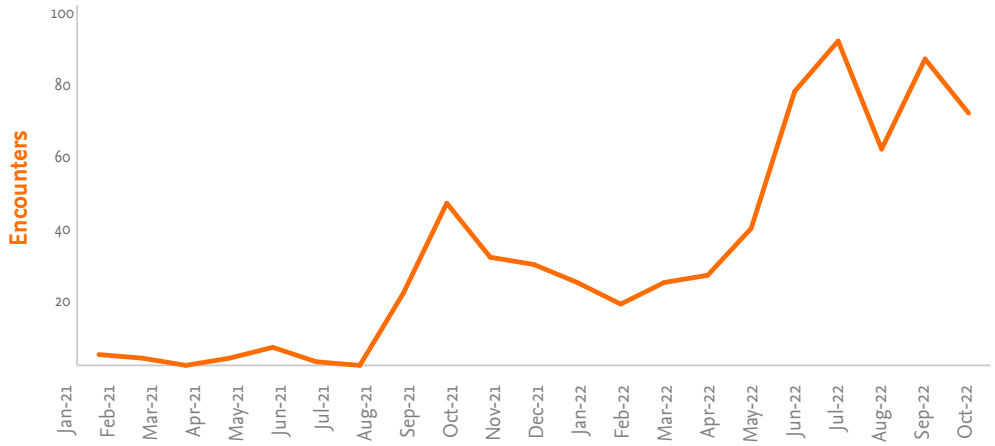

Figure 4: Monthly encounters for Pediatric Admit to Pediatric Ward with Evidence-Based Medicine Order Sets

Without order sets in place, doctors often have to place each order separately and refer to separate resources for clinical guidance, which can potentially result in errors and forgotten or unnecessary orders and also increases the time spent by clinicians in the EHR. This may lead to additional costs and waiting times for the patient, additional time needed by the care team, which has the potential to prolong the patient's stay.

The care planning process also plays a crucial role in helping the efficiency of nurses by promoting interdisciplinary collaboration, facilitating patient and family education, and supporting quality improvement efforts.

EHS wanted to ensure that its interdisciplinary team had a more efficient and effective way of defining and documenting care plans. In particular, they wanted to guarantee that their clinicians aligned their practices with standards set out by the Joint Commission International (JCI). The analysis of the evidence-based Care Plans in EHS' Wareed EHR system demonstrated that the integration of this evidence-based tool increased in usage, showing the value that clinicians place on solutions that are easy-to-use, evidence-based, structured and in line with the JCI standards.

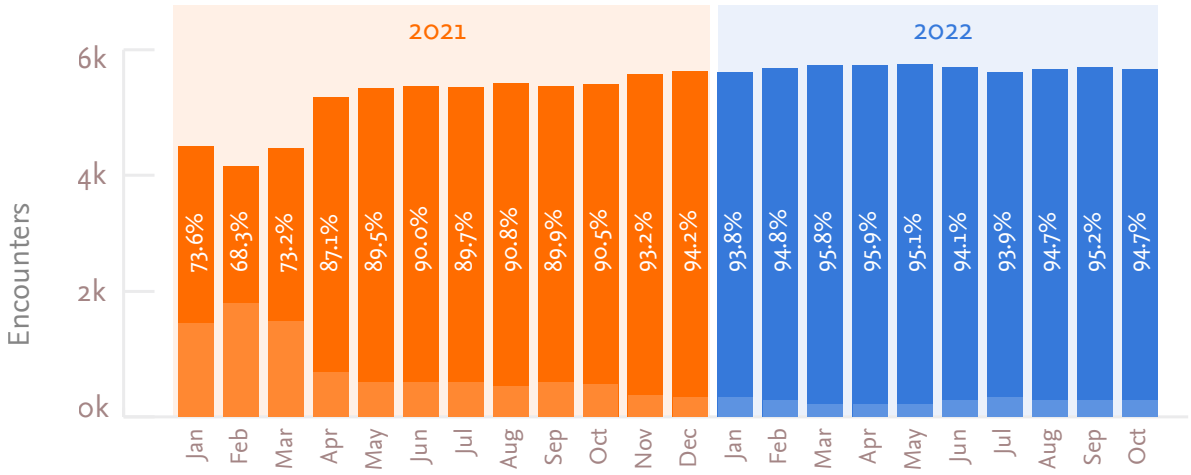

Figure 5: Monthly encounters with/ without IPOC through the implementation of evidence-based Care Plans at EHS.

"The patient could be discharged the same day so the same day the goals are met, which is amazing. We can also explain to our peers what's done and where we are if goals are met or not, do we have to resolve it, do we have to make a new one, or do we have to go with the same one." EHS Nurse.

Furthermore, care plans also enable HCPs to select appropriate clinical goals and activate all related interventions according to structured evidence-based guidance, allowing the workforce to utilize their time more efficiently. This process of goal setting helps to define clinical problems, personal needs and preferences of the patient and the likely steps required to achieve the agreed goals in a structured manner.

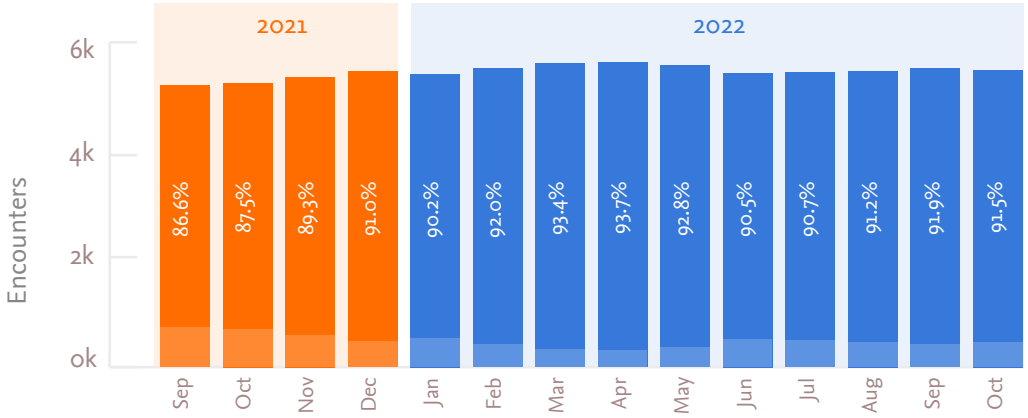

Figure 6: Monthly encounters with/ without IPOC within 24 hours

Figure 7: Overall encounters with/ without IPOC within 24 hours

One of the JCI standards is that when patients are admitted to hospitals and other primary healthcare settings every patient must have a care plan initiated within 24 hours of admission.[4] EHS wanted to ensure that their inpatient facilities met this requirement. With the adoption of evidence-based Care Plans at EHS, the data successfully demonstrated that nurses who utilized these Care Plans adhered to this requirement, as following implementation a higher percentage of patients received a care plan within 24 hours of IP admission. Enabling nurses to have access to these evidence-based Care Plans allowed them to document the care needed more efficiently, as shown in Figure 7.

The data analysis further demonstrated that evidence-based Care Plans support nurses to utilize their critical thinking and reasoning. At EHS, nurses not only used the Bronchiolitis Care Plans but also other relevant plans when a patient was diagnosed with bronchiolitis. This shows that by having an extensive library of care plans, nurses can easily find the relevant problems in order to create more effective and individualized care plans.

The additional support provided by the evidence-based Care Plans aided nurses in the delivery of individualized care plan to be written and those care plans help them prioritize care. ***"Care Plans make the job easier as you can prioritize the patient. I will go with this patient because they are the priority. With the old ones, there was no priority, we just went with it. But with this care plan, it allows you to prioritize the patient."*** EHS Nurse.

ENHANCING CARE DELIVERY THROUGH THE STANDARDIZATION OF CARE

The implementation of evidence-based Order Sets and Care Plans helps enable HCPs to adopt a safety checklist approach. This approach ensures that all patients receive a consistent level of care, even when different HCPs are involved, as they all follow the same evidence-based guidance rather than relying on individual memory. By leveraging evidence-based Order Sets and Care Plans, the healthcare workforce can effectively streamline the care delivery process, reduce variability in care, and promote standardization. As a result, each patient receives a consistent level of quality care, leading to improved overall outcomes.

The overarching goal for EHS was to improve efficiency, standardize practice, ensure compliance, and streamline workflows. Through the implementation of evidence-based Care Plans, EHS nurses reported a high level of satisfaction and confidence in the evidence-based content and reinforced the benefits of providing standardized care, ***"Care planning helps to standardize care.***
We can identify what is the problem, how we can achieve the goal and what interventions we can use that will help in the daily care of the patient. The old way was helpful, but it did not have that much importance before." EHS Nurse.

Similarly, EHS physicians using evidence-based Order Sets confirmed they were able to follow a safety checklist approach for all orders across the patient population, enabling them to provide the same quality of care, ***"Nobody can tell us that it was my mistake, or I missed it because we can say that we have the evidence-based Order Sets that you should have used. This is a supporting thing to help us, in our daily prescriptions, etc."*** EHS Physician.

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SUMMARY

The implementation of evidence-based Order Sets and Care Plans has shown to have a substantial impact on utilization, variability, and patient outcomes. These CDS solutions have the potential to enable HCPs to save time, increase efficiency, and guide the healthcare workforce towards standardized care. With ample evidence demonstrating the positive values of Order Sets and Care Plans in clinical settings, EHS recognized the importance of implementing these tools within its existing EHR system.

In conclusion, evidence-based Order Sets and Care Plans have played a significant role in delivering tangible benefits and establishing a new benchmark for high-quality, standardized care at EHS. **They are critical in helping to ensure a consistent level of patient care, improving efficiency, helping to reduce costs, and help support clinicians in achieving overall improvements in patient outcomes.** [1,2,3]

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About EHS:
Emirates Health Services is a government organization that provides patient services, health care facilities, and training services. EHS was established with the aim of enhancing the efficiency of the federal health sector in the United Arab Emirates, by providing health care and treatment services, and taking preventive measures and combating epidemics and diseases, as well as achieving sustainable development of health care.

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Please note that the results presented are from a single institution and findings may not be seen with every customer implementation.