A.

Clinical Decision Support Systems mark the advancements in health care technologies in today’s world. These are developed to augment clinicians with their decision making in the workflows. CDSS are often combined with Electronic Health Records to automate the process. CDSS are broadly classified into two categories namely, knowledge-based, and non-knowledge based (Sutton et al., 2020). Knowledge based systems contain a set of rules to produce and output from the given data (Sutton et al., 2020). On the other hand, non-knowledge-based systems contain software designed to aid decision making with incorporation of artificial intelligence (AI) and machine learning (ML) algorithms (Sutton et al., 2020).

Advantages:

* The most common benefit of CDSS is to possibly reduce medication errors. COPE systems are designed to meet this requirement by incorporating drug safety software that enables drug-drug interactions (Sutton et al., 2020).
* These systems account for improved patient safety, electronic drug dispensing systems (EDDS) are an example to this (Sutton et al., 2020). The scope for providing personalized medical care improved with CDSS as the monitoring is automated and advancements in patient remainder systems flourished (Dramburg et al., 2020). CDSS proved to be a valuable aid in detecting allergic conditions along with mobile health tools and further contributed to evidence-based medicine (Dramburg et al., 2020). CDSS also open gates to advanced research in health care to detect and predict diseases.
* The role of CDSS in clinical management is remarkable as it reduces the work of clinician to regulate the process of follow up and treatment remainders.
* Aids to streamline the process of admirative automation.

Disadvantages:

* The potential disadvantage accounts for software malfunctions. Poorly designed and misused Health Information Technology can lead to unintended consequences in Clinical Decision Support (Musen et al., 2021, p. 804). The algorithms employed are trained on the given datasets and there is a high chance of errors in prescribing the medications (Ash et al., 2007).
* Also, as this is a new and developing technology, its usage may be hampered by clinicians and there might be trust issues associated with patients (Sutton et al., 2020).
* The initial set up and maintenance of CDSS is expensive with limits its usage from small healthcare settings (Sutton et al., 2020).
* The role of CDSS measuring the outcomes of chronic diseases is quite challenging (Musen et al., 2021, p. 804).
* Alert fatigues: It is possible that too many insignificant alerts are given by these tools which prevents the clinician from answering the important alerts compromising patient safety (Sutton et al., 2020).

With the listed pros and cons of CDSS, it should be wise decision of clinician to use them to the desired extent.

B.

Clinical decision Support Systems can significantly improve the clinical outcomes to improve patient safety by aiding in the decisions of physicians. Here are few proposed best practices recommended:

* Developing patient care monitoring and alarming systems (Wright et al., 2010).
* CDSS works best when it is aligned with other organizational motivations (Wright et al., 2010).
* Continuous monitoring and evaluation of clinical impact of CDSS (Wright et al., 2010).
* Updating the software and keeping the content up to date is highly recommended (Wright et al., 2010).
* Maintaining high quality data is crucial for effective functioning (Wright et al., 2010).

Added to this, a public repository called CDS Connect is funded by U.S. Agency for Healthcare Quality and Research to store knowledge artifacts that promote sharing and interoperability (Musen et al., 2021, p. 804).

1.Considering the above recommendations, a systematic review conducted proposes the use of electronic clinical decision support tools to aid in the detection and diagnosis of cancer outcomes (Chima et al., 2019). Three studies showed reduced time to diagnose cancer when used with physician consultation and those used outside the consultations showed improvements in diagnosing risk of undetected cancers (Chima et al., 2019).

2.Another review shows that the set of clinical practice guidelines using CDS depends on evidence provided on recommendations (Filiatreault et al., 2018). Five pre-operative guidelines are recommended to manage the patients with hip fractures (Filiatreault et al., 2018).

C.

Personal Health records have gained functionality in the recent years and are integrated with clinical EHRs. Here patients are entitled to enter, view, and modify their own health information (Sutton et al., 2020). This is a great initiative to patient-focused care and CDS supported PHRs have proven to be ideal to implement shared decision making. These are often built as an extension to current EHRs using the same software or as standalone web-based and mobile-based applications (Sutton et al., 2020). This can serve as two-way relationship where the information entered by patient can be seen by clinician and information in EHR can be viewed by patient through PHR (Sutton et al., 2020). One such example is wearable glucose monitor developed by Stanford School of Medicine, which is connected to Apple’s Healthkit, that is in turn connected to Epic PHR, “Mychart” (Sutton et al., 2020). In this way, the flow of communication is ensured between patient and physician constantly and this constitutes for improved health education and awareness.

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Hello Mark,

You did an excellent job outlining the possible benefits and drawbacks of CDSS. I agree with your assertion that poor data quality and restricted access to medical records make it difficult to deploy CDSS with EHRs. Additionally, a significant obstacle to the CDSS adaptation has been discovered as user acceptability. Two models that incorporate the following have been suggested to increase user acceptance:

1. Improving the CDSS design to match user expectations (Khairat et al., 2018).
2. Permitting the user to govern CDSS output (Khairat et al., 2018).

With this, CDSS results can be enhanced to guarantee patient safety.

Khairat, S., Marc, D., Crosby, W., & Al Sanousi, A. (2018). Reasons for physicians not adopting clinical decision support systems: Critical Analysis. *JMIR Medical Informatics*, *6*(2), e8912.

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Summary:

1. All the group members share a common perspective that CDSS have contributed to improve the patient outcomes as they made information retrieval easy and significantly contributed to personalized medicine. The disadvantages tangled include poor and complex design of CDSS hampering its acceptance and usage. Software malfunctions is mentioned as the most common pitfall by most of the peers.
2. The two most common examples cited are the improvements in cancer diagnosis and recommendation of clinical guidelines using CDSS in case of hip fractures. Apart from these, evidence-based medicine is believed to be one of the best practices by some group members.
3. In a nutshell, patient decision support systems are to build in user acceptable and convenient format. The governing principle behind this technology is clinical data management according to most of the peers. Incorporating technologies like machine learning and artificial intelligence are believed to improve the outcomes.

(Patterson et al., 2019)

Patterson, B. W., Pulia, M. S., Ravi, S., Hoonakker, P. L. T., Schoofs Hundt, A., Wiegmann, D., Wirkus, E. J., Johnson, S., & Carayon, P. (2019). Scope and Impact of EHR integrated Clinical Decision Support in the Emergency Department: A Systematic Review. *Annals of Emergency Medicine*, *74*(2), 285–296. https://doi.org/10.1016/j.annemergmed.2018.10.034