Usefulness

"Usefulness" in medicine refers to the degree to which a treatment, diagnostic tool, or medical intervention effectively achieves its intended purpose and provides value in clinical practice. Here's how "usefulness" is evaluated across different aspects of healthcare:

1. Clinical Interventions Effectiveness: A treatment or intervention is considered useful if it reliably improves patient outcomes, such as reducing symptoms, curing disease, or extending life. This is often measured through clinical trials and real-world evidence.

Safety: Usefulness also involves assessing the safety of an intervention. A treatment that is highly effective but has unacceptable side effects may have limited usefulness in practice.

Cost-Effectiveness: Evaluating the cost relative to the benefits provided is crucial. An intervention that is both effective and economically viable (cost-effective) is generally considered more useful. This involves cost-effectiveness analyses and health economic evaluations.

2. Diagnostic Tools Accuracy: The usefulness of a diagnostic tool is measured by its ability to correctly identify or rule out diseases. This includes sensitivity (true positive rate), specificity (true negative rate), and overall diagnostic accuracy.

Practicality: The ease of use, accessibility, and speed of a diagnostic tool also contribute to its usefulness. For example, a diagnostic test that is quick, non-invasive, and affordable is more useful in a busy clinical setting.

3. Patient-Centered Measures Quality of Life: An intervention's usefulness is also determined by its impact on patients' quality of life. This includes assessing improvements in physical, emotional, and social well-being.

Patient Satisfaction: How well a treatment or diagnostic process aligns with patient preferences and needs can influence its perceived usefulness. High patient satisfaction often reflects that the intervention is useful from the patient's perspective.

4. Healthcare Systems and Protocols Guideline Integration: The usefulness of a treatment or diagnostic tool is often evaluated by its incorporation into clinical guidelines and protocols. If an intervention is recommended by authoritative bodies based on evidence, it is considered useful in standard practice.

Outcome Metrics: Healthcare systems use various metrics to evaluate the usefulness of interventions, such as recovery rates, relapse rates, and long-term health outcomes.

5. Research and Development Innovation and Advancement: The usefulness of new medical technologies or therapies is assessed based on their ability to advance current medical knowledge and practices. Innovative solutions that address unmet medical needs or improve existing standards of care are highly valued.

Evidence-Based Practice: Usefulness is determined through evidence-based research, which involves systematically reviewing and applying the best available evidence to make informed clinical decisions.

Examples Vaccines: Vaccines are evaluated for their usefulness based on their effectiveness in

preventing diseases, safety profile, and impact on public health. The introduction of a vaccine with high efficacy and safety significantly improves its usefulness.

Imaging Techniques: New imaging technologies like advanced MRI or PET scans are assessed for their usefulness by their ability to provide clearer, more detailed images that improve diagnosis and treatment planning.

Medication: A new medication is considered useful if it shows a significant benefit over existing treatments in terms of efficacy, safety, and patient compliance.

Summary Usefulness in medicine is about how well an intervention or tool meets its intended goals, improves patient outcomes, is practical and safe, and provides value in the context of overall healthcare. It encompasses effectiveness, safety, cost-effectiveness, and the impact on patient quality of life and satisfaction.

Truckenmueller et al. in a prospective study assesses the acceptance and usefulness of augmented 360° virtual reality (VR) videos for early student education and preparation in the field of neurosurgery.

Thirty-five third-year medical students participated. Augmented 360° VR videos depicting three neurosurgical procedures (lumbar discectomy, brain metastases resection, clipping of an aneurysm) were presented during elective seminars. Multiple questionnaires were employed to evaluate conceptual and technical aspects of the videos. The analysis utilized ordinal logistic regression to identify crucial factors contributing to the learning experience of the videos.

The videos were consistently rated as good to very good in quality, providing detailed demonstrations of intraoperative anatomy and surgical workflow. Students found the videos highly useful for their learning and preparation for surgical placements, and they strongly supported the establishment of a VR lounge for additional self-directed learning. Notably, 81% reported an increased interest in neurosurgery, and 47% acknowledged the potential influence of the videos on their future choice of specialization. Factors associated with a positive impact on students' interest and learning experience included high technical quality and comprehensive explanations of the surgical steps.

This study demonstrated the high acceptance of augmented 360° VR videos as a valuable tool for early student education in neurosurgery. While hands-on training remains indispensable, these videos promote conceptual knowledge, ignite interest in neurosurgery, and provide a much-needed orientation within the operating room. The incorporation of detailed explanations throughout the surgies with augmentation using superimposed elements, offers distinct advantages over simply observing live surgeries ¹⁾

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Truckenmueller P, Krantchev K, Rubarth K, Früh A, Mertens R, Bruening D, Stein C, Vajkoczy P, Picht T, Acker G. Augmented 360° 3D virtual reality for enhanced student training and education in neurosurgery. World Neurosurg. 2024 Jan 23:S1878-8750(24)00103-7. doi: 10.1016/j.wneu.2024.01.092. Epub ahead of print. PMID: 38272307.

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