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COMPREHENSIVE REVIEW ON THE ROLE OF LABORATORY SPECIALISTS IN DISEASE DIAGNOSIS AND MONITORING.

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ABSTRACT

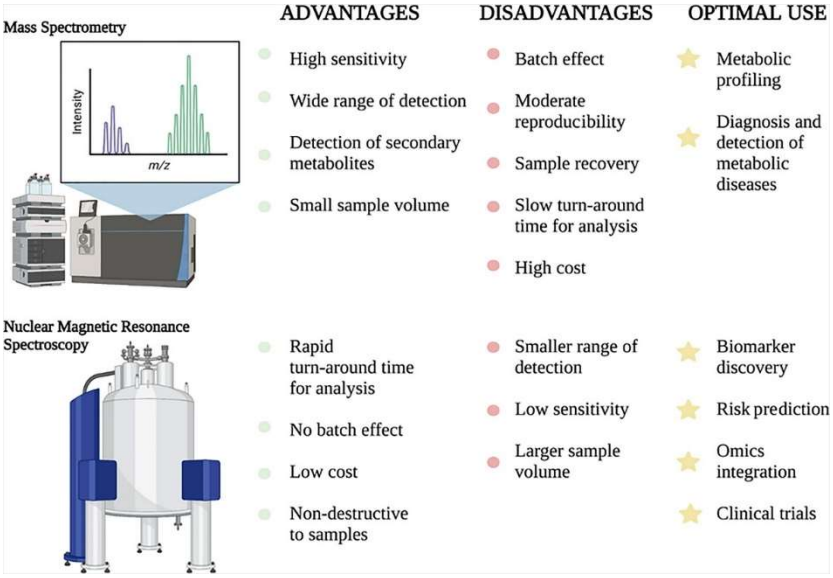
laboratory specialists are vital in determining, treating, and framing the spine of worldwide wellbeing. This comprehensive survey looks at the different parts of restorative proficiency, covering all angles of research facility testing, innovative progress, challenges, and prospects. Through a thorough examination of the writing and current hone, this audit highlights the significance of healthcare experts giving exact and convenient care of illness movement and giving clinical direction over numerous restorative specialties.

Keywords: laboratory specialists, disease diagnosis, monitoring, laboratory testing, healthcare, technological advancements

INTRODUCTION

An exact and convenient determination in present-day medication is fundamental for compelling infection administration and way better persistent care. Impact. Restorative experts, including research facility researchers, specialists, and pros, play a critical part in this preparation by performing different tests, analyzing tests, and translating the results. Their aptitudes and information are fundamental to recognizing infections, analyzing biomarkers, and screening maladies. This comprehensive survey highlights the vital part of therapeutic experts in diagnosis and care, investigating their parts, challenges, and trends (Eftekhari et., al 2021).

Figure 1: Clinical Applications in Laboratory Medicine



(Das & Pal 2020).

Mass spectrometry (MS) and attractive atomic reverberation spectroscopy (NMR) are capable explanatory procedures with excellent specificity and negative and positive clinical utilization in clinical trials. Mass spectrometry has numerous preferences in sedate testing. It has tall affectability and specificity and is competent in recognizing and measuring a broad run of analytes at moo concentrations, counting little particles, proteins and metabolites. MS is flexible and can be utilized with diverse ionization and mass spectrometry to meet distinctive test and expository needs. Furthermore, MS-based investigation can, at the same time, degree different parameters in a single test. These highlights make mass spectrometry perfect for clinical chemistry, toxicology, sedate examination and proteomics research applications.

However, mass spectrometry, moreover, has restrictions that must be taken into consideration. MS gear is complex and requires preparation and skill for operation and information investigation. Starting establishment and support costs can be high, particularly for high-performance gear (Khurana et., al 2021). the turnaround time for MS screening may be longer

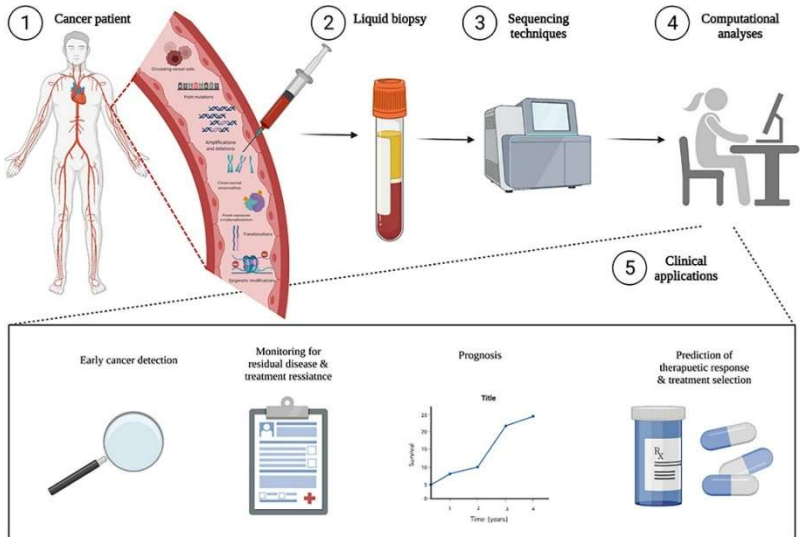
than other screening strategies, which may influence clinic choices over time. Atomic attractive reverberation spectroscopy (NMR) has incredible points of interest in sedate testing. NMR is non-destructive and can recognize particles without chemical changes. It gives auxiliary data and appears atomic intuitive; this makes it valuable for metabolomics, medicate discovery, and biomarker examination. NMR is additionally flexible and reproducible, advertising the leading quality and precision when measuring estimations in blends. Furthermore, NMR gadgets are basic and straightforward, making them appropriate for scheduled research facility use.

Although atomic attractive reverberation spectroscopy has points of interest, its confinements restrain its clinical application. NMR is less touchy than mass spectrometry, limiting its utilization to discovering moo concentrations. Moreover, NMR requires huge test sizes and long securing times; this may prevent its appropriateness for high-throughput or real-time filtering. Mass spectrometry and NMR spectroscopy have focal points and impediments in medical testing. Mass spectrometry is prevalent in affectability, multiplexing and speed; This makes it perfect for centring and high-throughput investigation. In differentiation, NMR spectroscopy gives test compatibility, quantitative precision, and ease of utilization, making it valuable for metabolomics and biomolecular ponders. The finest choice of this method depends on the particular therapeutic application, the examination's wants, and the laboratory's constrained assets (Ravi et., al 2020).

Responsibilities of Laboratory Specialists

- ✓ **Collection and Ponder of Tests:** Specialists are included in collecting, handling and arranging tests for investigation. Appropriate test collection strategies are imperative to guarantee test results' exactness and unwavering quality.
- ✓ **Testing:** Research facility professionals utilize instruments and procedures to perform various tests. These tests incorporate clinical chemistry, hematology, microbiology, immunology and atomic testing.
- ✓ **Quality Control and Confirmation:** It is imperative to control the quality and exactness of the test. Research facility professionals execute exacting controls to guarantee hardware calibration, reagent standardization and procedures are met.
- ✓ **Data Investigation and Translation:** Research facility specialists assess the comes about and decipher the comes about within the setting of quiet care. Their skill permits them to recognize irregular designs, set biomarker values, and give bits of knowledge to clinicians.
- ✓ **Collaboration with Wellbeing Care Group:** Coroners work closely with specialists, medical caretakers, and other wellbeing care suppliers to advance quality understanding of care. They give interview administrations, offer suggestions for assisting testing, and contribute to different understanding administration discussions (Sperotto et., al 2021).

Figure 2. diagnostic strategies and clinical utilization of biopsy liquid in cancer diagnosis, follow-up, guess and treatment options



(Bohn et., al 2020).

Figure 2. Biopsy liquid is used in cancer determination, follow-up, research facility treatment, and treatment—forecasting and executing treatment choices. Circulating tumour cells, their point transformations, intensifications and erasures, chromosomal anomalies, protein expression and phosphorylation, translocations, and epigenetic alterations can be recognized by fluid biopsies (e.g. blood tests) utilizing different quality sequencing methods. By analyzing their adequacy, these new tools can be used for early cancer location, infection screening, diagnosis, anticipating reaction to treatment, and giving self-selectable medications (Alowais et., al 2023).

The clinical application of fluid biopsy

- ✓ **Biopsy**: Biopsy liquid can identify cancer and reaction to treatment. Investigation of ctDNA levels or hereditary transformations permits prompt determination of disorder, response to therapy, and disclosure of medicate transformations to direct persistent treatment choices and treat the understanding well.
- ✓ **Assessment:** Fluid biopsy-derived biomarkers give essential data on infection forcefulness, metastatic potential, and persistent results. Hereditary investigation of tumours related to transformations can classify patients into hazard bunches and share diagnostic data, permitting personalized treatment methodologies and restorative control management (Khan et., al 2021).
- ✓ **Anticipating reaction:** Cement may offer assistance in foreseeing response to treatment and recognizing conceivable targets for exactness pharmaceutical. Investigation of hereditary changes such as transformations or medicate resistance markers can show assistance in anticipating reactions to particular medications, directing the determination of focused drugs, and progressing treatment.

- ✓ **Individualized sedate determination**: Atomic examination based on fluid biopsy may empower personalized sedate determination and treatment techniques based on personal characteristics (Cavalli et., al 2021). Recognizable proof of drug targets, biomarker-driven clinical trials, and atomic helpful choices can make strides in treatment, diminish sedate poisonous quality, and make strides in understanding outcomes.

By analyzing measurements and joining them with therapeutic records, fluid biopsies can potentially convert cancer treatment by giving proposals, real-time treatment and remedies for cancer. As continuous inquiries about and innovation proceed to progress the innovation and extend its clinical applications, this unused test can potentially convert the way cancer is analysed, overseen, and personalized medicine (Liu et., al 2020).

Technological Propels in Research Facility Medicine

Medical innovation within the research facility has rapidly advanced, revolutionizing symptomatic capabilities and expanding productivity. Key innovation patterns include:

Automation and technological autonomy: Computerized testing frameworks work more productively, decreasing turnaround times and lessening the hazard of human mistakes. technological autonomy empowers high-throughput estimations and increments the precision of modelling and analysis (Cappellani et., al 2020).

Point of Care Testing (POCT): POCT hardware empowers rapid on-site testing, giving quick comes about at the patient's bedside or remotely within the clinic. The innovation is precious for critical care centres, crisis rooms and dissemination centres (Butpheng et., al 2020).

Next Era Sequencing (NGS): NGS innovation has revolutionized atomic diagnostics by expanding the proficiency of DNA and RNA. This encourages the advancement of genomic profiling, personalized pharmaceuticals, and the revelation of hereditary modifications related to different diseases.

Digital Pathology: The computerized pathology stage digitizes histopathology slides, empowering further seeing, picture examination and collaboration between specialists. Innovation progresses symptomatic accuracy, facilitates telepathology meetings, and underpins education (Helmy et., al 2020).

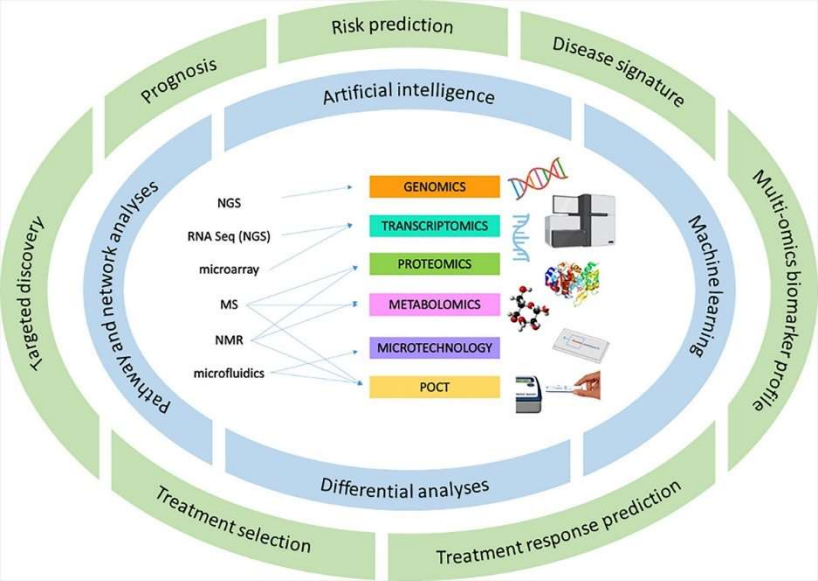
Challenges and Future Directions

- ✓ **Efficiency:** The request for clinical investigation proceeds to extend, putting weight on as of now existing research facilities. Tending to staff deficiencies through enrolment, preparation, and maintenance measures is essential to maintain research facility administration effectively (Madhuku et., al 2020).
- ✓ **Complexity:** Keeping up with advancing innovation requires customary preparation and proficient improvement for experts. Remaining current with the most recent strategies

and devices is pivotal to maintaining tall measures of symptomatic precision and reliability.

- ✓ **Compliance:** Research facilities must follow strict controls and certification benchmarks to guarantee the quality and keenness of the testing handle. Compliance with directions such as CLIA (Clinical Research Facility Advancement Corrections) and CAP (College of American Pathologists) is imperative but enforceable (Biosensor et., al 2020).
- ✓ **Data Administration and Sharing:** The expansion of electronic well-being records (EHRs) and vital records (LIS) poses challenges related to data administration, collaboration, and integration. Experts must explore complex data to guarantee consistent communication and trade of data in healthcare settings (Latif et., al 2020).

Trends and developments are poised to shape the future of laboratory medicine



(Favalli 2020).

Figure 1. State-of-the-art clinical investigations characterize clinical trials, and the data obtained from this unused innovation is combined with vital calculations to realize critical outcomes. Therapeutic comes about. The guarantee of accuracy and personalized pharmaceuticals is found at the crossing point of analytics. By coordinating expansive sums of data from well-structured clinical ponders, data innovation can contribute to a modern period of patient-centred clinical practice (Forchette et., al 2021).

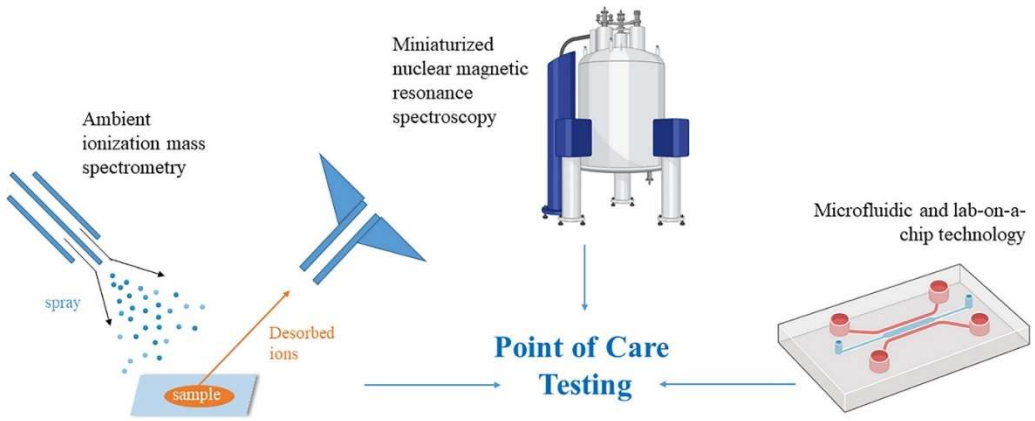
Personalized Pharmaceutical: Propels in genome sequencing and atomic investigation led to the rise of customized medication approaches. Research facility specialists will be vital in performing genomic testing, interpreting complex information, and prescribing personalized treatment procedures to patients.

Artificial intelligence (AI) and Machine Learning: artificial intelligence innovation guarantees the extension of diagnostic precision, foreseeing infection episodes, and moving forward with

research facility execution. Laboratory technicians will utilize AI abilities for information investigation, design acknowledgment, and decision-making to support information bases and make strides in diagnoses (Jafari et., al 2020).

Telemedicine and inaccessible monitoring: The expansion of telemedicine stages and remote observing innovations will affect the delivery of research facility administrations. specialists can work more closely with therapeutic groups to supply virtual discussions within the community and bolster clinical trials (Gosain et., al 2020).

Figure 4. Emerging and novel technological applications for point-of-care testing.



(Lippi & Plebian 2020).

- ✓ **Microfluidics and lab-on-a-chip gadgets:** Microfluidics stages and gadgets empower the miniaturization and gathering of complex explanatory forms for versatile and user-friendly designs. These frameworks encourage sequencing, pre-prototyping, and robotization, making POCT quick and cost-effective. Applications run from the study of disease transmission and biomarker testing to natural monitoring and personalized medicine (Miah et., al 2022).
- ✓ **Smartphone-based determination:** Smartphones' notoriety and progressed capacities have driven smartphone-based determination. POCT gadgets can interface to versatile applications examination, further observation, and genuine choice by utilizing., al control and cellular network. Smartphone testing offers comfort, portability and network, making it perfect for clinical, further quiet administration and on-site testing.
- ✓ **Wearable and implantable sensors:** Progresses in wearable and implantable sensor innovation empower quick and nonstop monitoring of body slightness and biomarkers. Sensors combine with savvy gadgets or remote systems to supply data for malady control, well-being monitoring and early mediation. POCT applications incorporate blood glucose monitoring for diabetes administration, cardiac biomarker testing for heart infection, and medication screening for personalized treatment.
- ✓ **Paper-based and chromatographic tests:** Paper-based and chromatographic tests are essential, cost-effective and can be given rapidly; this makes them reasonable for POCT in specific settings. These tests utilize capillary activity to transport tests and reagents

through porous materials, allowing analytes to be visualized without requiring specialized hardware (Kandasamy et., al 2020). Paper-based items are appropriate for various estimations and can be adjusted for testing, pinpointing and natural monitoring.

- ✓ **Biosensors and Nanotechnology:** Biosensors and nanotechnology-based stages utilize biorecognition components and nanomaterials to identify analytes with tall affectability and specificity. These gadgets permit label-free discovery, point-of-care, and small-scale operation, making them promising in POCT applications. Biosensors can be coordinated into handheld gadgets, body patches, or microfluidic frameworks to distinguish illnesses, cancer cells, and metabolic diseases rapidly and precisely.

Using unused innovations for measurement has extraordinary potential to convert treatment, progress quiet results, and unravel worldwide well-being issues (Chauhan, 2020). Leveraging progress in microfluidics, smartphone innovation, wearable sensors, paper-based diagnostics, and nanotechnology, POCT advances into a flexible and easy-to-use diagnosticapparatus for numerous applications, such as therapeutic and public well-being equipment.

CONCLUSION

Laboratory specialists are critical partners in healthcare preparation and are crucial in determination, care, and decision-making. Their ability, enthusiasm, and commitment to fabulousness are essential to giving precise and solid testing, making a difference to make strides, getting quiet results, and improving the well-being of society. As clinical inquiries advance with innovative headways and rising therapeutic methods, therapeutic experts will play an important part in future developments in sedate testing. Working to illuminate operational issues, embracing unused advances, and cultivating collaborative collaboration are essential to moving forward and assembling the changing needs of patients and worldwide healthcare systems (Allam, 2020).

RECOMMENDATION

- ✓ **Proceeding Proficient Advancement:** Research facility professionals are energized to get proceeding instruction and prepare to keep side by side of propels in research facility pharmaceutical, innovation, and best hones. Moving with instruction, organizing, and training can support proficient improvement and give mindfulness to modern processes.
- ✓ **Intrigue collaboration:** Encourage collaboration between research facility experts and clinical groups to encourage compelling communication, data sharing, and multidisciplinary decision-making. Move forward collaboration and energize collaboration among doctors to move forward with quiet care and cultivate a culture of collaboration.
- ✓ **Quality advancement arrange:** Actualize quality change plans within the test environment to make strides in the exactness, unwavering quality, and execution of diagnostics. Standard reviews, quality evaluations, and compliance with certification

benchmarks guarantee compliance with administrative prerequisites and best hones of accreditation standards (Sexton et., al 2020).

- ✓ **Integration of innovation:** Advancing innovation and utilizing modern arrangements to move forward research facility execution, increment diagnostic precision, and move forward quiet care. Contributing to state-of-the-art rebellious, test information frameworks, and information investigation capabilities will optimize research facility operations and encourage evidence-based decision-making.
- ✓ **Centralized persistent care:** Clarify the significance of centralized understanding care and the effect of research facility tests on clinical results. Experts are energized to lock in with patients, guarantee clear communication of what comes about, and address patients' concerns to pick up fulfilment and bolster the control of the persistent in healthcare (Agarwal et., al 2020).
- ✓ **Inquire about and Development:** Cultivate a culture of research and development within the clinical research facility to ceaselessly move forward and progress diagnostic strategies, biomarker revelation, and personalized solutions. Collaborative inquiry about programs and organizations with colleges can bolster development and contribute to advancing inquiry about aptitudes.

REFERENCE

Eftekhari, A., Alipour, M., Hodari, L., Maleki Diaz, S., Ardalan, M., Samiei, M., ... & Ceccherini, M. (2021). A comprehensive review of detection methods for SARS-CoV-2. *Microorganisms*, *9*(2), 232.https://www.mdpi.com/2076-2607/9/2/232

Das, S., & Pal, M. (2020). Non-invasive monitoring of human health by exhaled breath analysis: A comprehensive review. *Journal of The Electrochemical Society*, *167*(3), 037562.https://iopscience.iop.org/article/10.1149/1945-7111/ab67a6/meta

Chamola, V., Hasina, V., Gupta, V., & Guiana, M. (2020). A comprehensive review of the COVID-19 pandemic and the role of IoT, drones, AI, blockchain, and 5G in managing its impact. *Ieee access*, *8*, 90225-90265.https://ieeexplore.ieee.org/abstract/document/9086010/

Khurana, S. K., Sehrawat, A., Tiwari, R., Prasad, M., Gulati, B., Shabbir, M. Z., ... & Chiampa, W. (2021). Bovine brucellosis–a comprehensive review. *Veterinary Quarterly*, *41*(1), 61-88.https://www.tandfonline.com/doi/abs/10.1080/01652176.2020.1868616

Ravi, N., Cortade, D. L., Ng, E., & Wang, S. X. (2020). Diagnostics for SARS-CoV-2 detection: A comprehensive review of the FDA-EUA COVID-19 testing landscape. *Biosensors and bioelectronics*, *165*, 112454.https://www.sciencedirect.com/science/article/pii/S0956566320304486

Alowais, S. A., Alghamdi, S. S., Alsuhebany, N., Alqahtani, T., Alshaya, A. I., Almohareb, S. N., ... & Albekairy, A. M. (2023). Revolutionizing healthcare: the role of artificial intelligence in clinical practice. *BMC medical education*, *23*(1), 689.https://link.springer.com/article/10.1186/s12909-023-04698-z

Ahmad, Z., Rahim, S., Zubair, M., & Abdul-Ghafar, J. (2021). Artificial intelligence (AI) in medicine, current applications and future role with special emphasis on its potential and promise in pathology: present and future impact, obstacles including costs and acceptance among pathologists, practical and philosophical considerations. A comprehensive review. *Diagnostic pathology*, *16*, 1-16.https://link.springer.com/article/10.1186/s13000-021-01085-4

Sperotto, F., Friedman, K. G., Son, M. B. F., VanderPluym, C. J., Newburger, J. W., & Dionne, A. (2021). Cardiac manifestations in SARS-CoV-2-associated multisystem inflammatory syndrome in children: a comprehensive review and proposed clinical approach. *European journal of pediatrics*, *180*, 307-322.https://link.springer.com/article/10.1007/s00431-020-03766-6

Bohn, M. K., Lippi, G., Horvath, A., Sethi, S., Koch, D., Ferrari, M., ... & Adeli, K. (2020). Molecular, serological, and biochemical diagnosis and monitoring of COVID-19: IFCC taskforce evaluation of the latest evidence. *Clinical Chemistry and Laboratory Medicine (CCLM)*, *58*(7), 1037-1052.https://www.degruyter.com/document/doi/10.1515/cclm-2020-0722/html

Khan, M., Mehran, M. T., Haq, Z. U., Ullah, Z., Naqvi, S. R., Ihsan, M., & Abbass, H. (2021). Applications of artificial intelligence in COVID-19 pandemic: A comprehensive review. *Expert systems with applications*, *185*, 115695.https://www.sciencedirect.com/science/article/pii/S0957417421010794

Cavalli, G., Colafrancesco, S., Emmi, G., Imazio, M., Lopalco, G., Maggio, M. C., ... & Dinarello, C. A. (2021). Interleukin 1α: a comprehensive review on the role of IL-1α in the pathogenesis and treatment of autoimmune and inflammatory diseases. *Autoimmunity reviews*, *20*(3), 102763.https://www.sciencedirect.com/science/article/pii/S1568997221000227

Latif, S., Usman, M., Manzoor, S., Iqbal, W., Qadir, J., Tyson, G., ... & Crowcroft, J. (2020). Leveraging data science to combat COVID-19: A comprehensive review. *IEEE Transactions on Artificial Intelligence*, *1*(1), 85-103.https://ieeexplore.ieee.org/abstract/document/9184922/

Madjunkov, M., Dviri, M., & Librach, C. (2020). A comprehensive review of the impact of COVID-19 on human reproductive biology, assisted reproduction care and pregnancy: a

Canadian perspective. *Journal of Ovarian Research*, *13*(1), 1-18.https://ovarianresearch.biomedcentral.com/articles/10.1186/s13048-020-00737-1

Helmy, Y. A., Fawzy, M., Elaswad, A., Sobieh, A., Kenney, S. P., & Shehata, A. A. (2020). The COVID-19 pandemic: a comprehensive review of taxonomy, genetics, epidemiology, diagnosis, treatment, and control. *Journal of clinical medicine*, *9*(4), 1225.https://www.mdpi.com/2077-0383/9/4/1225

Butpheng, C., Yeh, K. H., & Xiong, H. (2020). Security and privacy in IoT-cloud-based e-health systems—A comprehensive review. *Symmetry*, *12*(7), 1191.https://www.mdpi.com/2073-8994/12/7/1191

Liu, S., See, K. C., Ngiam, K. Y., Celi, L. A., Sun, X., & Feng, M. (2020). Reinforcement learning for clinical decision support in critical care: comprehensive review. *Journal of medical Internet research*, *22*(7), e18477.https://www.jmir.org/2020/7/e18477/

Cappellani, D., Macchia, E., Falorni, A., & Marchetti, P. (2020). Insulin autoimmune syndrome (Hirata disease): a comprehensive review fifty years after its first description. *Diabetes, Metabolic Syndrome and Obesity*, 963-978.https://www.tandfonline.com/doi/abs/10.2147/DMSO.S219438

Buonsenso, D., Raffaelli, F., Tamburrini, E., Biasucci, D. G., Salvi, S., Smargiassi, A., ... & Moro, F. (2020). Clinical role of lung ultrasound for diagnosis and monitoring of COVID-19 pneumonia in pregnant women. *Ultrasound in Obstetrics & Gynecology*, *56*(1), 106-109.https://obgyn.onlinelibrary.wiley.com/doi/abs/10.1002/uog.22055

Favalli, E. G. (2020). Understanding the role of interleukin-6 (IL-6) in the joint and beyond: a comprehensive review of IL-6 inhibition for the management of rheumatoid arthritis. *Rheumatology and therapy*, *7*(3), 473-516.https://link.springer.com/article/10.1007/s40744-020-00219-2

Forchette, L., Sebastian, W., & Liu, T. (2021). A comprehensive review of COVID-19 virology, vaccines, variants, and therapeutics. *Current medical science*, 1-15.https://link.springer.com/article/10.1007/s11596-021-2395-1

Jafari, F., Javdansirat, S., Sanaie, S., Naseri, A., Shamekh, A., Rostamzadeh, D., & Dolati, S. (2020). Osteosarcoma: a comprehensive review of management and treatment strategies. *Annals of diagnostic pathology*, *49*, 151654.https://www.sciencedirect.com/science/article/pii/S1092913420302008

Gosain, R., Abdou, Y., Singh, A., Rana, N., Puzanov, I., & Ernstoff, M. S. (2020). COVID-19 and cancer: a comprehensive review. *Current oncology reports*, *22*, 1-15.https://link.springer.com/article/10.1007/s11912-020-00934-7

Lippi, G., & Plebani, M. (2020). The critical role of laboratory medicine during coronavirus disease 2019 (COVID-19) and other viral outbreaks. *Clinical Chemistry and Laboratory Medicine (CCLM)*, *58*(7), 1063-1069.https://www.degruyter.com/document/doi/10.1515/cclm-2020-0240/html

Miah, M. R., Yang, M., Khandaker, S., Bashar, M. M., Alsukaibi, A. K. D., Hassan, H. M., ... & Awual, M. R. (2022). Polypyrrole-based sensors for volatile organic compounds (VOCs) sensing and capturing: A comprehensive review. *Sensors and Actuators A: Physical*, *347*, 113933.https://www.sciencedirect.com/science/article/pii/S0924424722005684

Kandasamy, K., Srinivas, S., Achuthan, K., & Rangan, V. P. (2020). IoT cyber risk: A holistic analysis of cyber risk assessment frameworks, risk vectors, and risk ranking process. *EURASIP Journal on Information Security*, *2020*(1), 1-18.https://jis-eurasipjournals.springeropen.com/articles/10.1186/s13635-020-00111-0

Chauhan, S. (2020). Comprehensive review of coronavirus disease 2019 (COVID-19). *Biomedical journal*, *43*(4), 334-340.https://www.sciencedirect.com/science/article/pii/S2319417020300871

Allam, Z. (2020). The first 50 days of COVID-19: a detailed chronological timeline and extensive review of literature documenting the pandemic. *Surveying the Covid-19 pandemic and its implications*, 1.https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7378494/

Sexton, R. E., Al Hallak, M. N., Diab, M., & Azmi, A. S. (2020). Gastric cancer: a comprehensive review of current and future treatment strategies. *Cancer and Metastasis Reviews*, *39*, 1179-1203.https://link.springer.com/article/10.1007/s10555-020-09925-3

Agarwal, S., Punn, N. S., Sonbhadra, S. K., Tanveer, M., Nagabhushan, P., Pandian, K. K., & Saxena, P. (2020). Unleashing the power of disruptive and emerging technologies amid COVID-19: A detailed review. *arXiv preprint arXiv:2005.11507*.https://arxiv.org/abs/2005.11507