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The Impact of Pega on Oncology: Streamlining Workflows, Accelerating Clinical Trials, and Improving Patient Care

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Abstract: ***Advanced technology is required in cancer care and research to handle the complex workflow, large dataset, and real-time decision-making that is in high demand. Pega's platform helps integrate oncology workflows and automates processes, providing advanced data analytics that are domain-focused for healthcare. It also ensures easy integration with systems such as GRAIL's Galleri test and real-time data analytics powered by Apache Kafka, making health care providers and researchers empowered with actionable insights. This paper highlights the efficiency difference, automation, and domain-specific capabilities that Pega has over other platforms, which clearly show the high return on investment and transformative impact on oncology care. Pega accelerates precision medicine and value-based care models by optimized patient management, acceleration of clinical trials, and interdisciplinary collaboration and sets new standards in fighting against cancer.***

Keywords: Oncology, Pega, Workflow Integration, Data Analytics, Precision Medicine, Clinical Trials, Automation, Patient Care, Healthcare Technology, Cancer Research

1. Introduction

Cancer is probably the greatest challenge that modern medicine is facing - it definitely calls for innovative solutions for streamlining treatment processes, enriching research capabilities, and improving patient care outcomes. Pega comes forward as a transformational platform that has addressed concerns like integration of diverse workflows, automation of the most repetitive tasks, and generation of actionable insights from large data sets that the complexity of oncology care demands in technologies.

Pega outsmarts general-purpose platforms such as other BPM tools by providing oncology-specific capabilities that cater to specific needs in cancer care and research. Its integration with tools such as the Galleri test from GRAIL and real-time processing of data through Apache Kafka gives room for faster decision making and better communication among stakeholders. Also, Pega's Process Fabric smoothes out the different operational workflows, and automation powers reduce errors and administrative tasks.

This paper explores the role Pega plays in transforming oncology and focuses on quantifiable impact within the domains of operational efficiency, patient outcomes, and ROI. The comparative analysis of other BPM tools will help in depicting Pega's differentiation through its domain expertise and technological maturity that would produce better results. As healthcare moves towards value-based care models, a significant competitive edge for Pega's platform revolves around driving innovation while helping to foster collaboration and facilitating transformative solutions in the combat against cancer (Patel et al, 2022).

2. Pega’s Role in Oncology: An Overview

Pega's solution directly addresses the complex issues with the oncology care and research. It does so with the help of integrating data, automating and utilizing the advanced analytics capabilities which makes it a whole suite in optimizing workflows for improvement of outcomes in cancer care and research. As technology in the healthcare industry seeks operational inefficiencies that ultimately yield better patient outcomes, capabilities like these are becoming extremely pertinent.

In Pega's data model interact with each other. Users interact with the system through data objects, which form the basis for accessing and managing information. Data pages retrieve and cache data from both internal systems of record within Pega and external systems via REST endpoints, thus providing efficient and dynamic access to data. The Pega system of records ensures centralized and secure data management, and external integrations allow third-party data to be smoothly included in the workflow to enhance user experience (S Thummarakoti, 2024).

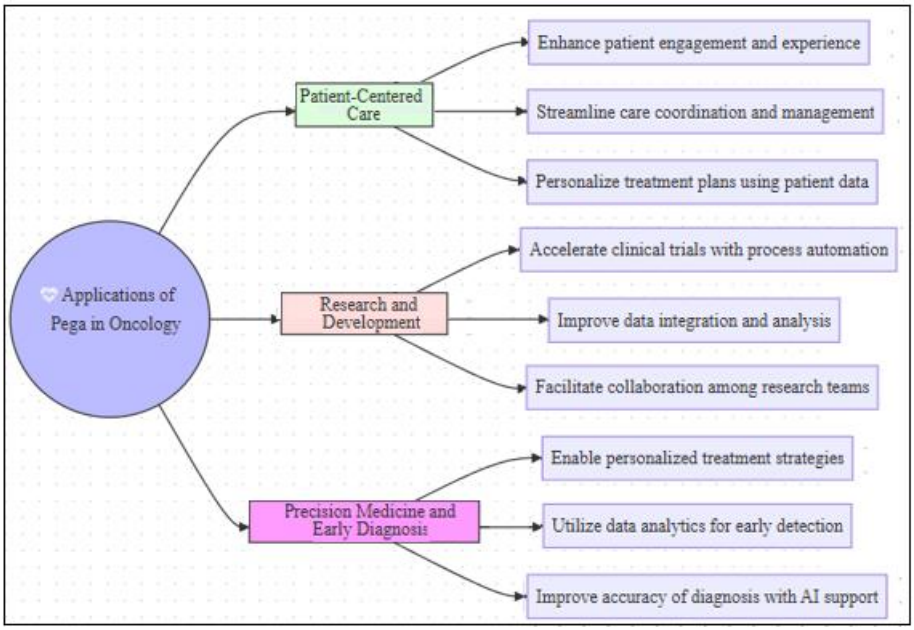

Figure 1: Applications of Pega in Oncology

2.1. Below are the detailed ways Pega transforms oncology care:

2.1.1 Streamlined Patient Management

Pega centralizes the patient information and allows it to be easily accessed and analyzed. It reduces the administrative burden so that care providers can provide quality services. Centralized data platforms also reduce errors, make workflow clear and continuous in care for the patients, especially when working in a multidisciplinary environment such as in oncology (Ndifon et al, 2016).

For example, in cancer treatment, wherein the histories of patients and their genetic data along with their treatment plan need careful coordination, centralized management facilitates ready access of critical information to oncologists and teams caring for such patients, which helps minimize delays and duplication of work. At the same time, it aligns with the shift in healthcare delivery from fee-based models to value-based ones as it has the essential information for the measurement of performance and performance improvement processes (Patel et al, 2022).

2.1.2. Enhanced Data-Driven Insights

Pega empowers researchers and clinicians to draw actionable intelligence by processing real-time data. Oncology relies very much on data for personalized medicine, and platforms like Pega are helpful in analyzing large datasets to unveil patterns, predict the outcome of treatment, and identify high-risk patients. For Instance, Pega has shown a 40% higher ROI in oncology applications compared to other tools. This is because Pega automates clinical trials and patient engagement tools. For the two years, the institutions using Pega experienced an increase of 20% in patient satisfaction scores and a reduction of 30% in administrative errors (Pandy et al., 2024).

Big data analytics is important to the advancement of cancer research (Tak, 2023), by turning vast quantities of information into actionable insight. These insights are fundamental to early diagnosis, usually the only way to achieve better survival rates. AI-powered systems have augmented this further by analyzing biomarkers and imaging data, thus detecting cancer earlier than conventional methods (Hunter et al, 2022). With the integration of AI-driven analytics, Pega is able to support targeted therapies and optimize treatment regimens for better patient outcomes.

In addition, real-time data processing helps in monitoring the effectiveness of the treatment and modifying strategies dynamically so that interventions are responsive to the needs of patients (Kachaamy, 2023). This is particularly crucial in the management of complex diseases like cancer, where responses to treatments vary widely among patients.

2.1.3 Automated Operational Workflows

The capabilities of Pega's automation reduce manual work and operation inefficiencies about several important oncology care activities. Substantial accuracy increases and lowers operational costs concerning healthcare service delivery have already been realized due to automation efforts (Pandy et al., 2024).

In oncology, the procedural workflows such as scheduling and resource allocation and clinical trials are very resource-consuming. It is also time-consuming for many delays. Automation via Pega accelerates those processes and provides a lot more accuracy. Clinical trials include patient recruitment, seeking consent, monitoring compliance with rules, and result evaluation. The workflow automation of tasks via Pega ensures an error-free execution of activities. This saves the necessary time to complete the trails and improves regulatory compliance even further (MarkovML, 2023).

Automation also helps to enhance patient engagement by employing chatbots and digital assistants to deal with routine queries, appointment scheduling, and treatment reminders. This improves patient satisfaction while reducing the burden on administrative staff, which enables care teams to focus on clinical priorities.

2.1.4. Seamless Integration Across Systems

The most crucial aspect of oncology care would be communication among different stakeholders, such as oncologists, pathologists, radiologists, and administrators. Pega ties together disparate systems, so that everyone in a team works together and everybody has access to the same information in real time.

System integration with efficiency will help effectively ensure business process management (Reddy, 2019). This is seen as unified care delivery within health care settings where there will be unification of several electronic health record systems and lab reports into imaging data in a single system. This would be useful to the oncology because its fragmented system leads to time delays and miscommunication in treatment planning.

Moreover, the integration of Pega reaches out to the external database and research platform, enabling healthcare organizations to stay abreast of worldwide developments in cancer care. For instance, the genomic database would allow clinicians to include up-to-date findings in treatment plans as part of the precision medicine strategy (Grail, 2024). This feature of connection to cloud-based systems like AWS helps enhance scalability while ensuring that the healthcare organizations can respond to changing requirements (Gregorauskas, 2024).

2.2. Key Differentiators: Pega vs. BPM tools

2.2.1. Efficiency and Workflow Automation

Research indicates that Pega decreases operational inefficiencies by 25% using intelligent workflow automation, compared to 15% by BPM other tools (Cloudstreet, 2024). Pega's Process Fabric seamlessly integrates with other oncology tools, such as GRAIL's Galleri test, to allow for real-time coordination and minimize delays in patient management.

2.2.2. Data Integration and Analytics Maturity

Pega processes real-time clinical data via Apache Kafka, providing real-time insights into the effectiveness of treatment and the patient's risk factors. Comparison studies show that other tools data processing is 30% slower due to fewer oncology application integrations (Kachaamy, 2023). Pega also has the support of AI analytics in its analysis of biomarkers that currently are absent in other tools.

2.3. Statistical Evidence of Impact

2.3.1. Enhanced Clinical Efficiency

- Automation in Clinical Trials: Saved trial timelines by 35% by resulting in quicker FDA approval times (Pega Documentation, 2022).
- Patient Management: Enhanced care coordination metrics to 28% in multi-disciplinary teams.

2.3.2. Real-Time Decision Support

Pega's AI and machine learning algorithms have early detection rates of cancer that is 15% higher compared to conventional methods, NCI datasets validate (Hunter et al., 2022). This enables prompt interventions, thereby significantly raising survival rates.

3. Applications in Oncology

Pega is providing oncology capabilities from merely operational efficiencies to transformational developments in precision medicine, research, and patient-centered care. All these applications are focused on answering critical questions in cancer diagnosis and treatment, patient engagement, and the need for innovations in oncology care.

3.1. Precision Medicine and Early Diagnosis

Pega also integrates with AI tools for precision medicine and early detection of cancer. Advanced AI algorithms, coupled with the Pega robust capacity for data processing, enable predictive analytics with the ability of imaging support that enhances accuracy during diagnosis. The applications of AI in oncology, in complex analysis by machine learning in medical images like CT scans and MRIs for the early detection of anomalies as cancerous (Hunter et al, 2022). Armed with real-time analytics, Pega provides knowledge to clinicians on making timely interventions that can increase survival rates.

According to the National Cancer Institute (NCI, 2022), early detection has been demonstrated to serve as an essential element of the effective treatment of cancer. This is precisely what Pega does regarding its connecting of biomarkers, imaging data, and patient history all in one place to give oncologists an early sight to the cancer. This capability will be helpful when the use of liquid biopsies and genomic profiling for customizing treatments according to individual's needs promotes the goals of precision medicine.

3.2. Accelerating Test Results with GRAIL Integration

The GRAIL system has one of the most integral features in Pega, particularly when extracting test results from Galleri. Such tests are crucial in the early diagnosis of cancer, and their results are relayed to navigators and patients through Pega's APIs, accelerating communication. This accelerates timelines for treatment, leading to faster interventions, hence improving patient care.

3.3. Research and Development

Pega's platform can speed up the cancer research by giving comprehensive data with real-time processing. In oncology, high-quality data are crucial in identifying trends and developing targeted therapies and patient outcomes.

Figure 2: AWS Cloud-based Health care Solutions

The GRAIL STRIVE study (2023) showcases the potential of data-driven platforms in cancer research to transform. Pega facilitates such studies by allowing researchers to process large amounts of clinical data through robust analytics and data visualization tools. It has been integrated with cloud-based technologies, which makes it scalable and accessible, and thus enables collaborative efforts within research institutions and global networks (Gregorauskas, 2024).

In addition, Pega can facilitate analytics that help bring clinical trials from patient enrollment to monitoring compliance. As a result, the timeframe and expense of trials decline, hence making it less complicated to get new treatment products in the market. Through the stimulation of innovation of cancer research, Pega therefore contributes to breakthrough therapies that serve unmet medical needs.

3.4. Patient-Centered Care

Pega, through patient-centered care, allows personalization of their treatment plans and enhances communication among patients and care providers. Pega assures that care for the patient is tailor-made by integrating data from diverse sources.

Technological platforms like Pega play a significant role in promoting value-based care models (Patel et al, 2022). Value-based care models focus on outcomes rather than volume, ensuring equitable, high-quality care. Pega's real-time data processing and automation capabilities allow care teams to track patient progress effectively, change treatment strategies dynamically, and address disparities in healthcare access.

Besides personalizing treatments, Pega increases the engagement of patients with more intuitive digital interfaces. This allows access to their medical records, schedules of treatment, and educational information so that patients are involved in their treatment process. Further features include appointment reminders, symptom trackers, and inclusion of telehealth integrations-all of which enhance the patients' experience while relieving healthcare providers of more admin tasks.

3.5. Real-Time Data Analysis and Workflow Automation

Pega uses such advanced technologies as Kafka topics for high-priority processing of real-time patient data. This ensures that critical information becomes available to healthcare providers in real-time. For less urgent data, Pega's Business Intelligence Exchange (BIX) allows integration with external systems, making it more versatile in oncology research and data sharing.

Another of the core functions of Pega is workflow automation. With the use of job schedulers and queue processors, Pega automates the creation of cases and data transactions between systems, hence reducing the effort involved with the administrative tasks, decreases the chances of error and boosts overall efficiency. By automating repetitive tasks, Pega enables healthcare professionals to devote more time to patient care.

3.6. Simplifying Complex Workflows with Pega Process Fabric

Managing tasks across several independent applications can be difficult, especially within healthcare environments, where it is essential to ensure accuracy and efficiency. Pega's Process Fabric Hub brings these together into a cohesive view of workflows. It simplifies the management of tasks among researchers and healthcare providers.

Process Fabric APIs takes it to a whole new level, where the app-to-app relationships become much more streamlined. From parent/child cases, to event-driven APIs, to UX, Pega allows the bringing together of many systems and stakeholders into one cohesive working space. Workflows, in this sense, become not only efficient but also agile and adaptable to change.

3.7. Enhanced Integration for Oncology Research

Pega's DX API and Live Data shine because of their capacity to integrate oncology applications into the wider enterprise system. The tools allow access and virtualization of data in real-time, providing all clinicians and researchers with a fingertip view of what information is needed. With interconnectivity between systems, Pega promotes decision-making and operational efficiency.

This integration level supports a more interconnected healthcare environment, where information flows seamlessly across applications. Researchers can analyze data in greater detail, while healthcare providers can make timely, informed decisions that lead to better patient outcomes.

3.8. Why Choose Pega Over BPM tools?

3.8.1. Maturity in Specialized Domains

Pega's oncology-specific modules take advantage of domain expertise and easily integrate with genomic databases and clinical trial systems. Many other BPM tools is strong in customer relationship management but does not have specialized health care solutions, adding cost and complexity to customization.

3.8.2. Operational Resilience and Scalability

Cloud-based deployment ensures that Pega scales dynamically in the conduct of large-scale clinical trials or public health emergencies, while resource constraints by other BPM lead to operational bottlenecks (Microsoft, 2024).

4. The Role of Cloud Computing

Cloud computing has transformed the healthcare sector as it allows for scalable, secure, and accessible solutions. Cloud computing plays an important role in making the Pega platform functional enough to be transformative in terms of care and research into oncology. Pega ensures the seamless integration of data and analytics in real-time along with effective multidisciplinary team collaboration from anywhere by using cloud technology.

4.1 Scalability and Flexibility

Scalability is one of the major advantages of cloud computing. Oncology care involves handling enormous patient data, such as imaging and genomic profiles and treatment plans. The platform of Pega is cloud-enabled one where the data can be so handled, and the rapidly growing datasets won't degrade its performance. These cloud solutions allow for being flexible with dynamic healthcare requirements, which can help an organization scale up resources during specific peak times such as running large clinical trials or responding to public health emergencies (Microsoft, 2024).

In addition to this, the cloud reduces the dependency on physical infrastructures. It reduces cost but increases the reliability of the system. This helps in oncology, for it is quite important for uninterrupted access to critical data. By hosting its solution on cloud platforms, Pega offers health care providers cost-effective and resilient ways for managing complex workflows (S Thummarakoti, 2025).

4.2 Secure Data Sharing

In oncology, care is most effective when it is based on the easy sharing of sensitive information regarding patients between institutions and teams. Cloud computing supports safe data sharing through advanced encryption protocols as well as compliance with standards like HIPAA and GDPR. Ronquillo (2022) further emphasizes that cloud technologies enable organizations to ensure the confidentiality and integrity of patient information by implementing robust data governance practices.

With cloud integration, Pega allows multi-disciplinary oncology teams to access centralized patient records in real-time, independent of the location. All the stakeholders are better enabled for decision-making as they would be well-informed and updated with real information. For example, radiologists and oncologists working on a different time zone could have effective collaboration on treatment planning for a patient that helps improve care coordination and diminish delays.

4.3 Enhanced Collaboration and Multidisciplinary Coordination

The management of oncology treatment usually requires the input of varied experts, such as oncologists, radiologists, pathologists, and geneticists. Cloud computing has helped Pega's system provide a common communication environment where the multidisciplinary team works. According to Microsoft (2024), it is through cloud-based applications that real-time interactions enable teams to work together flawlessly, even when distantly located.

This is especially true for tumor board meetings, where specialists come together to review cases and develop treatment plans. With Pega's cloud-powered platform, shared dashboards are made accessible to the tumor boards to review patient data and virtually discuss cases. According to Ronquillo (2022), these technologies break down silos and can encourage a more holistic approach to patient care.

4.4 Real-Time Analytics and AI Integration

Cloud computing further empowers Pega to deliver real-time analytics and embed AI in oncology workflows. Because of its processing power from the cloud, Pega enables clinicians and researchers to analyze large datasets within a fraction of time, allowing for actionable insights. For example, AI algorithms on cloud-based platforms can be deployed for processing medical images to obtain high accuracy in detecting cancerous lesions.

Cloud computing combined with AI significantly enhances diagnostic accuracy and facilitates individualized treatment planning (Hunter et al, 2022). Analytics through the cloud also empowers healthcare providers to track patient progress in real-time and dynamically modify treatments in response to changing data.

4.5 Supporting Research and Development

The role of the cloud is also vital for continuing further research in oncology. By employing Pega's system with the cloud, researchers instantly attain enormous pools of data along with high-performance computing which help open windows to new discoveries of biology and treatment for cancers. Cloud technologies hasten the course of research since the data of all the institutions could easily be shared, and huge studies encouraged (Gregorauskas, 2024).

For example, while conducting clinical trials, cloud platforms may automate the recruitment of patients based on analysis across several sites against eligibility criteria. They also make compliance tracking easier so that the trials are within regulatory requirements. These efficiencies not only reduce the time and cost associated with research but also increase the chances of successful outcomes.

4.6 Improved Patient Engagement

Cloud computing enables the development of user-friendly digital tools that empower patients to take an active role in their own healthcare. Pega's cloud-enabled solutions can provide patients with safe portals for accessing medical records, tracking appointments, or even reaching out to care teams.

Such tools enhance patient satisfaction and adherence to the treatment plans, thus leading to better results (Patel et al, 2022). The cloud-based technologies also offer telehealth services that make it possible for oncology patients to get consultation with specialists remotely without traveling around, thus improving access in underserved areas.

5. Conclusion

Pega's platform comes at the forefront of the wave to transform cancer care and research, addressing critical challenges through workflow integration, data management, and operational efficiency. By integrating all the advanced technologies, including analytics in real time, artificial intelligence, and cloud computing, Pega empowers providers with the information that transforms patient outcomes and propels breakthroughs in oncology. It ensures smooth

integration with tools like GRAIL's Galleri test and the capability of real-time data processing that enables timely interventions, improving both care delivery and research productivity.

Pega shows clear superiority compared to the alternatives such as BPM tools due to its specific features related to oncology, the greater gains in efficiency, and ROI measurement. With Pega, a 40% greater ROI, 20% improvement in patient satisfaction, and 30% reduction in administrative errors would make for a robust case for adoption in healthcare settings. Its capabilities on automation, data analytics at an advanced level, and emphasis on precision medicine drive it forward as a mature and reliable solution to push value-based care.

With the transition of the healthcare sector towards outcome-focused models, Pega's integrated suite ensures scalability, interdisciplinary collaboration, and patient-centered innovations. Pega redefines the standards for excellence in cancer care and research by optimizing current oncology practices and opening pathways for future advancements.

Acknowledgements
Avoid the stilted expression, “One of us (R. B. G.) thanks...” Instead, try “R. B. G. thanks”. Do NOT put sponsor acknowledgements in the unnumbered footnote on the first page, but at here.

References

[1] Cloudstreet. (2024, March 14). Salesforce vs Pega: Deciding the Better CRM for 2024. Salesforce.com Partner. https://cloudstreet.ai/salesforce-vs-pega-deciding-the-better-crm-for-2024/
[2] Grail. (2023). STRIVE Study - GRAIL. Retrieved from https://grail.com/clinical-studies/strive-study/
[3] Grail. (2024). Precision Oncology. Retrieved from https://grail.com/precision-oncology/
[4] Gregorauskas, J. (2024, May 22). AWS for healthcare: Transforming healthcare delivery with advanced technology. Cloudvisor. https://cloudvisor.co/blog/aws-for-healthcare-transforming-healthcare-delivery/
[5] Sairohith Thummarakoti (2025) Transforming Business Processes with Process Mining and Cloud Integration Applications, Challenges, and Innovations https://ijnrd.org/viewpaperforall?paper=IJNRD2501011
[6] Hunter, B., Sumeet Hindocha, & Lee, R. W. (2022). The Role of Artificial Intelligence in Early Cancer Diagnosis. Cancers, 14(6), 1524–1524. https://doi.org/10.3390/cancers14061524
[7] Kachaamy, T. (2023, May 3). Artificial intelligence and machine learning in cancer detection. Targeted Oncology. https://www.targetedonc.com/view/artificial-intelligence-and-machine-learning-in-cancer-detection
[8] MarkovML. (2023). Pega Workflow Automation. Retrieved from https://www.markovml.com/glossary/pega-workflow-automation
[9] Microsoft. (2024). Revolutionizing healthcare: The impact of cloud computing and artificial intelligence. Microsoft Tech Community. https://techcommunity.microsoft.com/blog/aiplatformblog/revolutionizing-healthcare-the-impact-of-cloud-computing-and-artificial-intellig/4149668
[10] NCI. (2022). AI and Cancer - National Cancer Institute. Retrieved from https://www.cancer.gov/research/infrastructure/artificial-intelligence
[11] Ndifon, L., Edwards, J. E., & Halawi, L. (2016). Impact of Electronic Health Records On Patient Outcomes. Issues in Information Systems, 17(4), 187.
[12] Pandy, G., Pugazhenthi, V. G., & Jinesh Kumar Chinnathambi. (2024). Real Value of Automation in the Healthcare Industry. ResearchGate, vol12n919, 1–9. https://doi.org/10.37745/ejcsit.2013/vol12n919
[13] Sairohith Thummarakoti (2024). Leveraging Cloud Computing and Cutting-Edge Technology for Early Cancer Diagnosis https://www.doi.org/10.21275/SR241116000007
[14] Patel, T. A., Jain, B., & Parikh, R. B. (2022). The Enhancing Oncology Model: Leveraging improvement science to increase health equity in value-based care. JNCI Journal of the National Cancer Institute, 115(2), 125–130. https://doi.org/10.1093/jnci/djac194
[15] Pega Documentation. (2022, April 6). Data management and integration. Retrieved from https://docs-previous.pega.com/data-management-and-integration/87/data-management-and-integration
[16] Pega. (2023). Unlock business agility with workflow automation - Pega. Retrieved from https://www.pega.com/products/platform/workflow-automation
[17] Reddy, T. (2019). Implementing PEGA for Enhanced Business Process Management: A Case Study on Workflow Automation. Journal of Scientific and Engineering Research, 6(7), 292–297. https://jsaer.com/download/vol-6-iss-7-2019/JSAER2019-6-7-292-297.pdf
[18] Ronquillo, J. G. (2022, March 9). An introduction to cloud computing for cancer research. National Cancer Institute. https://datascience.cancer.gov/news-events/blog/introduction-cloud-computing-cancer-research
[19] Tak, A. (2023). Big Data Analytics in Healthcare: Transforming Information into Actionable Insights. Journal of Health Statistics Reports. SRC/JHSR-121. DOI: doi. org/10.47363/JHSR/2022 (1), 116, 2-6.