



# Automated Workflow for Care Plan Assignment Based on Patient Data

Satwik Mamidi

Salesforce Developer, USA

## ABSTRACT

Effective handling of large volumes of patient data in the manual system is significantly hectic and time-consuming. It also enhances the risk of error while developing tailored care plans for individual patients in a healthcare setting. Thus, there was a need to automate the regular or routine tasks related to the care plan development while effective handling of patient data. The Automated Workflow Management Systems are the systems developed for the care plan development of individual patients depending on their patient history, vital signs and the needs of patients while considering healthcare protocols.

These systems are developed depending on the power of technology such as Artificial Intelligence (AI), Machine Learning (ML) and Data Analytics. These technologies help enhance the accuracy and efficiency of personalized care plan development for individual patients and also help in the automation of routine tasks. There is a need to integrate the system seamlessly with other present systems to prevent operational disruption. However, there is a need to take care of security and privacy issues to comply with healthcare security protocols such as HIPAA.

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Automated Workflow, Patient Data, Data Analysis, Patient Care, Personalized Care, Technologies

## Introduction

Healthcare professionals need to handle a large volume of patient data and they sometimes face significant challenges handling those data in an efficient way. Effective handling of the data of each patient is significantly important for tailoring the care plans as per the needs of each patient. Automation of repetitive tasks using advanced technologies such as Artificial Intelligence, Machine Learning as well as Robotics Process Automation (RPA) can significantly help in enhancing the seamlessness of the patient care process while enhancing efficiency, and accuracy as well as improving patient outcomes [1]. These technologies can significantly help in analysis of history and records of patients in real-time which further makes it easier for tailoring the care plan for individual patients. In this process, advanced technologies such as Artificial Intelligence (AI), Machine Learning (ML) and data analytics have been utilized to effectively handle and analyze large volumes of data to tailor care plans for each patient as well as effectively manage patient records, scheduling appointments and also sending reminders to each patient.

The main aim of this paper is to evaluate the impact of an automated workflow system on the care plans of patients while efficiently handling patient data and tailoring care plans as per patient requirements to enhance the overall operational efficiency and quality of service delivery in a healthcare setting.

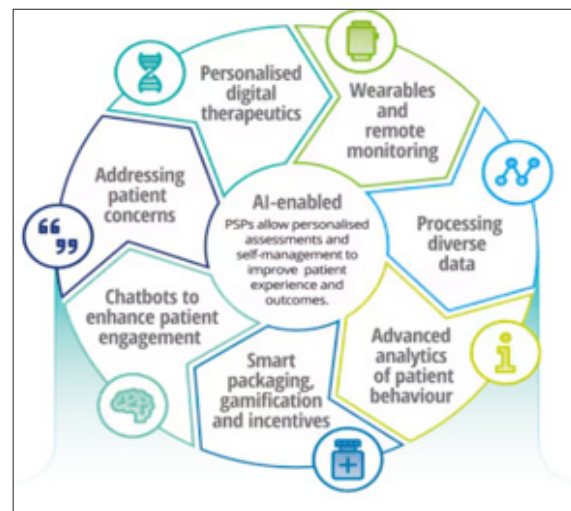


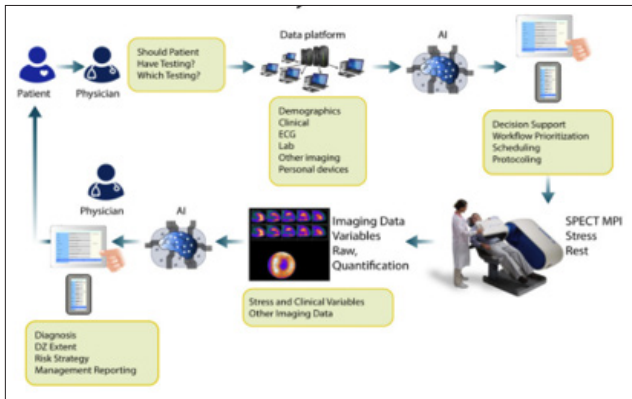
Figure 1: Role of AI in Improving Patient-Support Program [2].

## Background

In this present era, healthcare has become significantly data-driven where the ability to handle large volumes of data of numerous patients has become one of the significant challenges for professionals to make informed decisions. In this era of personalized treatment of patients, professionals or healthcare settings need to take care of patient information and relevant data accurately to provide them with a tailored care plan [3].

Contact: Satwik Mamidi, Salesforce Developer, USA.

Care plans are a significantly important tool that helps in guiding the treatment plan of an individual patient. Depending on the specific health condition and treatment requirement a care plan is developed which further helps in enhancing the outcomes of the healthcare initiatives for that particular patient.



**Figure 2:** Potential Diagnostic and Prognostic Computation in an Individual Patient by AI [4].

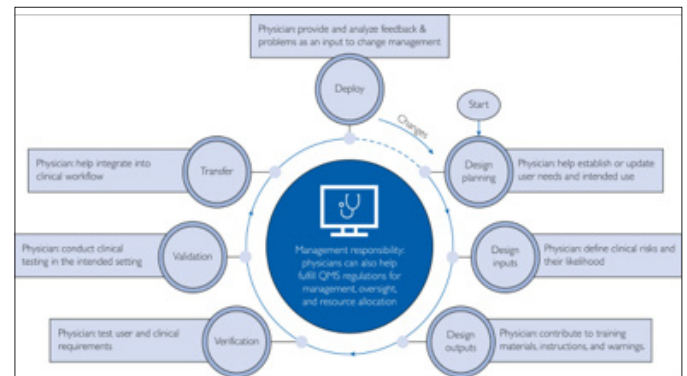
However, the traditional data handling method was done by humans which is significantly error-prone as well as it was time consuming. In addition to that, there is a need to understand the manual assessment of the data of individual patients, sometimes requiring critical administrative work and also can delay the proactive treatment of a patient. On the other hand, through the implementation of automated workflow systems and advanced technology such as Artificial Intelligence and Machine Learning algorithms such as neural networks or decision trees can significantly help in prediction of patient outcomes depending on analysis of the available patient records [5]. This further helps the healthcare professionals can proactively measure the health condition of the patient depending on the available data of the patient, maintaining predefined care protocols and also considering healthcare indicators [6]. Technologies such as Natural Language Processing (NLP) to analyze the notes of patients, predictive modeling and also AI-driven decision support systems which will further help in identification and management of large volume of patient data [5]. It also helps in tailoring personalized care plans for the patient as per the condition of the patient. This further enhances the accuracy and efficiency of the care plans.

### Case Studies

Further healthcare organizations can significantly study the successful implementation of AI to generate personalized care plans and other related successful case studies of implementation of AI for healthcare purposes. One of the prominent examples is The Mount Sinai Organization which has implemented AI for interaction of CT scans with other patient data to develop care plans. On the other hand, Mayo Clinic also utilize the power of AI for matching the patient data with the most relevant clinical trials which further help them in personalizing care plan for the patients.

### Problem Statement

The main problem area regarding manual systems of data handling and providing tailored care plans for each individual patient is significantly slow as well as inefficient which further leads to potential delays in providing care plans. In addition to that sometimes-administrative works associated with data handling and processing further reduce the proactiveness of the care plan development. Manual systems are also error-prone which can further negatively impact the effectiveness of the care plan provided. Thus, there is a requirement for more efficient systems that can help in effectively handling patient data and developing and providing care plans accurately and promptly.



**Figure 3:** Management Responsibility - Quality Management System [7].

### Proposed Solution

In order to solve the issues related to manual systems of patient data handling and analysis there is a need to leverage advanced technologies such as Artificial Intelligence, Machine Learning and data analytics to automate the workflow of healthcare settings. This will further help in the effective handling of patient data as well as accurate analysis and care plan development.

### Key Features of Automated Workflow Systems for Care Plan Assignment

- **Data Integration:** These systems significantly integrate with Electronic Health Records to help the system pull patient data automatically to ensure that real-time information is used to develop personalized care plans.
- **AI-Powered Decision-Making:** AI algorithms such as neural networks and logistic regression models can analyze available patient data including medical history and vital signs to develop a tailored care plan depending on predefined healthcare protocols [8].
- **Real-Time Updates:** It continuously monitors real-time data updates which further contribute to automatic upgradation of the care plan. Machine learning models or algorithms significantly process data continuously to analyze real-time data and adjust care plan as per the changing patient data.
- **Customizable Care Plans:** Healthcare professionals also can adjust care plans as per the actual requirement of the patient while AI systems help in understanding critical deviations.



Figure 4: Integrating Data from Multiple Formats [2].

### Implementation Considerations

- **Data Privacy and Security:** Strong data protection mechanisms should be implemented to protect sensitive and personal data of patients and comply with healthcare privacy regulations such as HIPAA [9]. There is a need to implement data encryption, firewall implementation, patch tests, regular system audits and also regular data backup to enhance comprehensive data security.
- **Staff Training:** Before implementation staff should be aware of this system implementation and after implementation training should be provided for effective utilization of the system.
- **System Integration:** The automated workflow system should be integrated with the other existing systems seamlessly to prevent operational disruption.

### Methodology

#### Systematic Approach for Implementing the Workflow Automation System

- **Identify Processes for Automation:** There is a need to select processes that would be automated such as patient data handling, data analysis, care plan development, data upgradation, notification etcetera.
- **Map and Design Workflow:** There is a need to develop an effective integration strategy with the existing system in order to maintain seamless operational processes in a healthcare setting. The healthcare organizations may leverage small scale integration at first which will comply with the cost and further when they get good results from the AI-driven care plan system they can go for large-scale implementation. This graduation implementation approach will also help in maintaining operational workflow.
- **Define Goals:** The goals will be improving patient data handling and data analysis accuracy to develop prompt and accurate care plans personalized for individual patients.

- **Select and Implement Software:** There are different software available for automation of workflow management in healthcare settings. For example, Salesforce is an automated workflow management software that helps in the effective development of accurate and personalized care plans for individual patients [9].
- **Train Employees:** Training such as simulation-based training should be provided to enhance the utilization of the system and also prevent change management.
- **Measure Success with KPIs:** Develop KPIs such as enhanced accuracy of care plan development and improved rate of patient outcomes should be measured to understand the effectiveness of the system.
- **Continuous Monitoring and Improvement:** After successful implementation, there is a need for continuous monitoring and collecting feedback from the users to report to the vendor for further adjustments or upgrades.

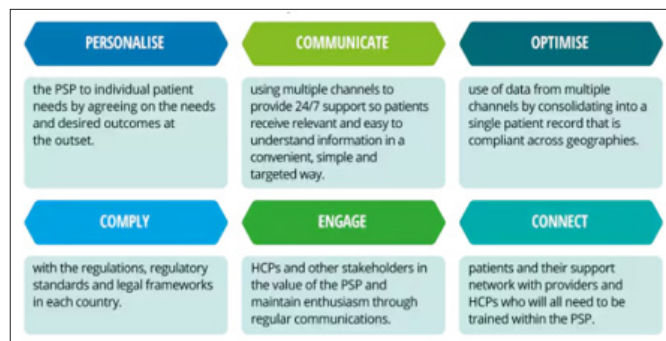


Figure 5: Key Criteria for Successful Implementation [2].

### Results and Discussion

There are multiple benefits that the Automated Workflow System can provide interns of care plan development for individual patients

- **Enhanced Accuracy:** This system will help in enhancing data handling and data analysis processes which will further enhance the accuracy of care plan development for individual patients as per their data and needs [10].
- **Improved Efficiency:** Prompt development of care plans leveraging data of individual patients will further enhance the efficiency of interventions.
- **Enhanced Patient Outcomes:** Automation of Care Plans for individual patients will reduce the delay and need for administrative work which will enhance the overall patient outcomes [11].
- **Challenges:** However, there is a need to keep in mind the issue of data security and privacy concerns, where there is a need for continuous improvement to enhance efficiency. In addition to that, there might be some other challenges such as effective and seamless integration challenge with existing healthcare systems which can impact the operational efficiency by disrupting that. Further, there is also a need to evaluate the initial setting costs which might not be affordable for all healthcare settings. On the other hand, implementation will take a transition which might develop

employee resistance which should be addressed by adopting an effective change management strategy such as Lewin's Change Management model or framework.

### Conclusion

In conclusion, it can be stated that workflow automation is significantly important for healthcare systems as it contains the handling and analysis of large volumes of data of patients. The manual systems are significantly time-consuming and prone to errors which further reduce the effectiveness of care plans provided for patients. System automation through AI, ML and data analytics can help in the effective handling of large volumes of data and also accurate data analysis and care plan development depending on the results of the analysis. Workflow automation systems significantly help enhance the accuracy and efficiency of care plan development which further enhances patient outcomes.

### References

- [1] Zayas-Cabán T, Okubo TH, Posnack S (2023) Priorities to accelerate workflow automation in health care. *Journal of the American Medical Informatics Association* 30: 195-201.
- [2] Deloitte (2022) Intelligent post-launch patient support: Insights. Deloitte.
- [3] Riaño D, Real F, López-Vallverdú JA, Campana F, Ercolani S, et al. (2012) An ontology-based personalization of healthcare knowledge to support clinical decisions for chronically ill patients. *Journal of biomedical informatics* 45: 429-446.
- [4] Mayo Clinic (2020) Artificial Intelligence in Cardiology: Present and Future. Mayo.
- [5] Shahid J, Ahmad R, Kiani AK, Ahmad T, Saeed S, et al. (2022) Data protection and privacy of the internet of healthcare things (IoHTs). *Applied Sciences* 12: 1927.
- [6] Amantea IA, Di Leva A, Sulis E (2019) Risk-aware business process management: a case study in healthcare. *The Future of Risk Management. Perspectives on Law, Healthcare, and the Environment* 1: 157-174.
- [7] Mayo Clinic Proceedings: Digital Health (2023) Navigating US Regulation of Artificial Intelligence in Medicine. A Primer for Physicians.
- [8] Cote CD, Kim PJ (2019) Artificial intelligence in anesthesiology: Moving into the future. *University of Toronto Medical Journal* 96: 33-36.
- [9] Salesforce (2022) Healthcare CRM Software: A Complete Guide. Salesforce.
- [10] Covington EL, Chen X, Younge KC, Lee C, Matuszak MM, et al. (2016) Improving treatment plan evaluation with automation. *Journal of applied clinical medical physics* 17: 16-31.
- [11] Patterson ES, Cook RI, Render ML (2002) Improving patient safety by identifying side effects from introducing bar coding in medication administration. *Journal of the American Medical Informatics Association* 9: 540-553.
- [12] Comito C, Falcone D, Forestiero A (2022) AI-driven clinical decision support: enhancing disease diagnosis exploiting patients similarity. *IEEE* 10: 6878-6888.