Servicenow & Generative AI: Improving Infant Mortality Rate

Sravanthi Mallireddy

Software Developer

Abstract

The paper explores the integration of ServiceNow and Generative AI to improve healthcare delivery and reduce infant mortality rates. By combining ServiceNow's process automation and service management capabilities with Generative AI's predictive analytics, healthcare providers can make better decisions and allocate resources. Machine learning algorithms can predict newborn mortality by examining birth weight, gestational age, and maternal health status. Gen AI can automate operations, produce personalized treatment plans, and enable real-time monitoring of at-risk populations. The study aims to contribute to global public health initiatives by focusing on creative solutions and best practices, emphasizing the importance of interdisciplinary collaboration and pushing for legislative reforms to incorporate advanced technical solutions into mother and child health programs.

Keywords: Rural Health Authorities (RHAs), AI and machine learning:

1. Introduction:

One of the best methods to gauge how well a nation's health system is working is to look at the number of deaths that occur each year and the causes of those deaths. Health authorities can assess how they prioritize public health efforts by using mortality data. Deaths can be expressed as a rate per 100,000 population annually or as the total number of deaths per year. The age distribution of the population has an impact on the number of fatalities per100,000 people. If two populations' age distributions differ, then their overall death rates will differ even when they have the same age-specific mortality rates for a given cause of death. It is possible to compare mortality in a nation with a younger population to mortality in a nation with an older population by using age-standardized mortality rates. Infant mortality is a major worldwide health issue, with large variations across areas and demographic groups. The World Health Organization (WHO) defines infant mortality as the death of a live-born child within the first year of life. According to recent data, roughly 2.4 million newborns died in 2020, underscoring the critical need for effective interventions.[1][2]

This work looks into how ServiceNow, a leader in digital workflow solutions, and Generative AI may revolutionize healthcare delivery systems to meet this essential issue. Infant mortality is frequently a mirror of larger systemic concerns within healthcare systems, such as disparities in access to care, service quality, and socioeconomic variables influencing maternal health. We have the opportunity to close these disparities and build more equal healthcare environments by leveraging innovative technologies such as ServiceNow and Gen AI.

Understanding Infant Mortality:

It is affected by a number of factors, includingsocioeconomic position, access to healthcare, maternal education, and underlying health issues. A thorough understanding of

these factors is required for devising targeted solutions. Families with lower incomes frequently have restricted access to adequate healthcare services, which can lead to higher infant death rates. For example, insufficient prenatal care can lead to undiscovered difficulties throughout pregnancy, endangering both maternal and newborn health. [6]

The rates of infant mortality differ significantly between nations. The infant mortality rate is fewer than one death for every 1,000 live births in some nations, including Japan. The infant mortality rate in other nations, like Angola, is over 150 deaths for every 1,000 live births.Infant mortality rates differ from nation to nation for a variety of causes. The degree of poverty, the state of the environment, and the standard of health care are some of the most significant causes.

Furthermore, regional limitations can impede prompt medical care throughout pregnancy and after deliveries, worsening the issue. In rural areas where healthcare facilities may be sparse or poorly equipped, expectant mothers may face significant challenges in accessing necessary care. Additionally, cultural beliefs and practices may influence healthcare-seeking behaviors among mothers, further complicating efforts to reduce infant mortality rates. Geographic obstacles compound the problems connected with infant mortality, especially in rural areas where healthcare access is frequently limited.

The physical distance to healthcare facilities may discourage pregnant mothers from obtaining critical prenatal and postnatal treatment, resulting in undiscovered issues that endanger both maternal and newborn health. In many rural regions, a dearth of healthcare practitioners exacerbates the problem, making it difficult for families to access prompt medical care.[4][8]Furthermore, transportation issues impede access; many families lack dependable transportation to healthcare institutions, which can lead to missed visits and insufficient care. Cultural attitudes may also influence healthcare-seeking behaviors, leading some families to prefer traditional therapies over modern medical interventions.

Causes of Infant Mortality Rate.

There are numerous reasons of infant death. Some of the causes can be prevented, while others cannot. Some of the causes are medical-related, while others are not.

Health-related causes of infant mortality include premature birth, low birth weight, congenital defects, sudden infant death syndrome (SIDS), and infections as shown in the above Figure 1:Encouraging Healthy Pregenancy

Premature birth is the birth of a baby before 37 weeks of gestation. A newborn is considered low birth weight if he or she weighs less than 5.5 pounds when born. Congenital abnormalities are congenital defects that are present from birth. SIDS is the sudden death of an infant under one year of age that cannot be explained after a comprehensive inquiry. Pneumonia, meningitis, and sepsis are all types of infections.

Non-health-related causes of infant mortality include accidents, homicide, and suicide. Accidents may involve car accidents, asphyxia, ordrowning. Homicide refers to the intentional killing of another person. Suicide is the deliberate ending of one's own life.

Many of the causes of infant death are avoidable. Premature birth, low birth weight, congenital defects, SIDS, and infections are all preventable with proper prenatal care. Accidents, homicide, and suicide are all preventable with proper safety precautions.

Role of ServiceNow in Healthcare Service:

Now offers a platform for streamlining workflows and increasing operational efficiency in healthcare environments. Its advantages include workflow automation, which helps healthcare providers

to automate administrative duties, freeing them up to focus on patient care rather than paperwork. For example, automated appointment scheduling can drastically cut patient wait times while ensuring that resources are deployed efficiently.

Furthermore, ServiceNow enables seamless integration of patient data across several platforms, enhancing care coordination among healthcare professionals. This integration is critical for ensuring that all physicians participating in a patient's care have access to current information on treatment plans and medical histories. The platform also enables real-time monitoring of at-risk patients through dashboards that aggregate data from multiple sources; this allows healthcare professionals to identify potential issues before they escalate into more serious problems. Furthermore, ServiceNow's reporting capabilities enable enterprises to track patterns in patient outcomes across time.

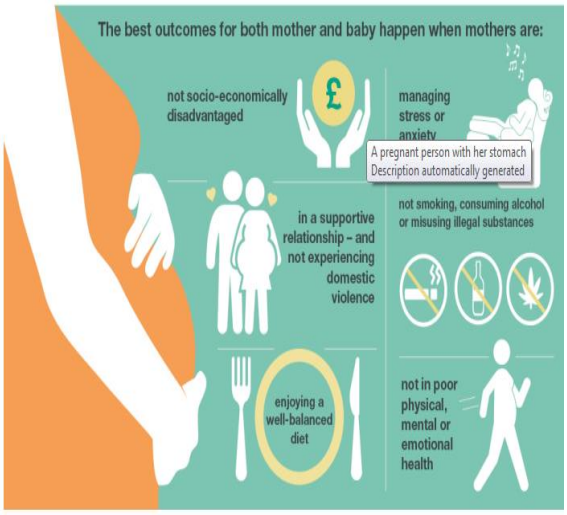

Figure 1:Encouraging Healthy Pregenancy

By recognizing patterns in infant mortality, such as common risk factors or regional disparities, healthcare clinicians can create tailored interventions to improve outcomes for high-risk populations.

ServiceNow's capabilities go beyond simple workflow automation, including innovative features that greatly improve patient care. The platform's integration of Generative AI enables the construction of efficient communication channels among healthcare providers, ensuring that all team members are in sync on patient care plans in real time. This is especially significant in complex cases involving numerous specialists, as it allows for the quick transmission of critical information including discharge summaries and treatment updates.

Generative AI:

An Overview Generative AI refers to algorithms that can create new content from existing data. This technology has a number of uses in healthcare, including reducing newborn mortality rates. Predictive analytics is an important use; Gen AI can examine historical data to forecast outcomes such as infant mortality risks by recognizing trends in patient data. For example, machine learning models trained on huge datasets can detect correlations between numerous parameters, such as mother age or socioeconomic status, and infant mortality rates. These findings help healthcare practitioners properly prioritize therapies for high-risk groups.

Furthermore, Generative AI may generate individualized care plans adapted to individual patient profiles based on their unique medical histories and risk factors, improving treatment

effectiveness by ensuring that each patient receives care that is appropriate to their requirements. Generative AI also automates documentation processes such as discharge summaries and referral letters, reducing administrative duties for healthcare personnel and giving them more time to deliver direct patient care. By automating these operations, hospitals can improve operational efficiency while also improving overall treatment quality. Furthermore, Generative AI has the potential to improve communication between patients and healthcare practitioners by creating training materials personalized to individual patients based on their symptoms or treatment plans. This individualized approach not only empowers patients, but it also motivates them to follow medical recommendations, which is critical for improving overall health results.

Improving Healthcare Outcomes with Gen AI Generative AI has the potential to drastically reduce infant mortality through numerous applications. For example, Gen AI- powered risk prediction models can identify high-risk pregnancies early on by analyzing characteristics such as maternal age, access to prenatal care, and socioeconomic status.

This allows healthcare practitioners to execute targeted therapies before issues occur. Furthermore, Gen AI can improve prenatal care by making personalized suggestions for prenatal checkups and screenings based on specific patient information. For example, if a model determines that certain demographic groups are more likely to experience specific pregnancy issues, such as preterm birth, it may recommend more surveillance or additional resources for such populations.

Case Studies:

Several case studies demonstrate the successful integration of ServiceNow and Generative AI in improving healthcare outcomes, namely newborn mortality rates. For example, one hospital network that used predictive analytics saw a

20% drop in infant death rates over two years as a result of targeted interventions based on identified risk factors. This network utilized Gen AI algorithms trained on demographic data from their patient population; these algorithms identified specific groups at higher risk for complications during pregnancy or childbirth.

Another public health program used Generative AI to improve prenatal care delivery processes, resulting in higher attendance at prenatal appointments by expectant mothers in marginalized neighborhoods. The effort successfully increased overall prenatal service engagement by implementing a predictive analytics-informed outreach strategy that targeted moms who were less likely to attend regular sessions. These case studies demonstrate not only the usefulness of incorporating new technologies into established healthcare systems, but also how data-driven methods may directly enhance health outcomes for vulnerable populations. Furthermore, they emphasize the significance of collaboration between technology developers and healthcare practitioners; successful adoption is strongly reliant on understanding clinical procedures and efficiently utilizing technological breakthroughs.

Challenges and Ethical Considerations:

While the benefits of combining ServiceNow and Generative AI into healthcare are significant, there are still hurdles that must be solved before successful adoption. Data privacy is a top priority when dealing with sensitive patient information; securing this data is critical for sustaining trust between patients and healthcare providers. Compliance with standards such as HIPAA (Health Insurance Portability and Accountability Act) is critical when dealing with sensitive health information.

Furthermore, there is the potential of algorithmic bias; ensuring that AI models are trained on varied datasets is critical to avoiding biased results that may disproportionately affect specific populations. If an algorithm is trained on data from a single demographic group, such as largely urban inhabitants, it may underperform when applied to rural or underrepresented communities. Regulatory compliance also poses challenges; adhering to healthcare regulations while leveraging advanced technologies requires careful planning and execution. Stakeholders must work collaboratively across disciplines—including legal experts—to navigate these complexities effectively without stifling innovation or limiting access to beneficial technologies.[11]]12] Furthermore, ethical considerations go beyond compliance to include broader societal ramifications such as ensuring equitable access to modern technology such Gen AI tools for all people, regardless of socioeconomic level or geographic location. To ensure equal distribution, authorities will need to take proactive steps, as well as technical breakthroughs, focused at enhancing maternal health outcomes universally rather than benefiting particular populations more than others as shown in below Figure 2:Ethics by design.

Looking ahead, continued breakthroughs in both ServiceNow's capabilities and Generative AI offer even greater gains in healthcare delivery systems focused at lowering infant mortalityFuture research should focus on broadening the scope of prediction models to include other variables influencing infant health outcomes, such as environmental factors or community resources, as well as improving collaboration among stakeholders participating in maternal and child health programs.

There is an urgent need for advocacy for policies that support technological integration into public health frameworks; policymakers must recognize the value of using technology not only as an operational tool, but also as a means of achieving broader social equity goals in maternal and child health contexts.

We exploring collaborations between technology companies and public health organizations could lead to innovative solutions tailored specifically to underserved communities facing high rates of infant mortality due largely to a lack of access to quality care services available in more affluent areas would be beneficial moving forward! Engaging communities directly through participatory approaches ensures culturally appropriate interventions while fostering trust between providers and recipients, ultimately contributing positively to long-term sustainability efforts aimed at improving overall population wellness, including reducing preventable infant deaths.

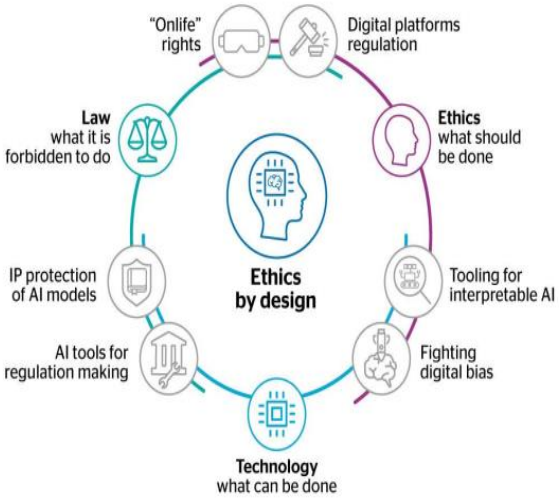

Figure 1:Ethics by design

Community Engagement and Education:

Community engagement and education play critical roles in lowering newborn death rates. Effective public health projects frequently rely on the active participation of community residents, who are best positioned to understand the specific difficulties and requirements of their local communities. Partnerships between healthcare practitioners, local groups, and community leaders can help to establish culturally sensitive initiatives that address unique difficulties that families confront.

For example, community health workers (CHWs) can act as crucial liaisons between healthcare institutions and marginalized populations, educating them on prenatal care, nutrition, and infant health practices. Educational programs emphasizing the need of frequent prenatal visits, vaccines, and healthy sleep practices can provide families with the information they need to make educated health decisions.

Furthermore, utilizing technology, such as mobile applications or social media platforms, can improve outreach efforts by delivering information fast and effectively. These applications can give appointment reminders, educational information, and even virtual support groups for expecting mothers. Furthermore, involving local influencers and trustworthy individuals in communities helps broaden the reach of these campaigns, ensuring that messages resonate with a wide range of audiences. Finally, engaging communities in the debate about mother and child health builds trust while also encouraging community responsibility for improving health outcomes.

CONCLUSION:

The integration of ServiceNow and Generative AI can significantly reduce newborn mortality rates by improving healthcare procedures, data management, and predictive analytics. This allows healthcare providers to focus on patient care, while real-time monitoring ensures all stakeholders have access to up-to-date patient health information. Community engagement and education are crucial in promoting proactive health management. Policy advocacy is essential for addressing the core causes of infant mortality, focusing on equitable access to healthcare services and addressing social determinants of health. Collaborating across sectors to create comprehensive solutions ensures all families have the resources they need for success. The combined efforts of technology innovation, community involvement, and strong policy lobbying can lead to a healthier future for both mothers and infants.

REFERENCES:

1. Kwok TC, Henry C, Saffaran S, Meeks M, Bates D, Van Laree D, et al. Application and potential of artificial intelligence in neonatal medicine. Semen Fetal Neonatal Med. (2022) Apr 18;101346.
2. Fairchild KD, Schelonka RL, Kaufman DA, Carlo WA, Kattwinkel J, Porcelli PJ, et al. Septicemia mortality reduction in neonates in a heart rate characteristics monitoring trial. Pediatr Res.2013;74:570–5.
3. Hoodbhoy Z, Masroor Jeelani S, Aziz A, Habib MI, Iqbal B, Akmal W, et al. Machine learning for child and adolescent health: A systematic review. Pediatrics. (2021) Jan;147.
4. Stoll BJ, Hansen NI, Bell EF, Walsh MC, Carlo WA, Shankaran S, et al. Trends in care practices, morbidity, and mortality of extremely preterm neonates, 1993-2012. JAMA. 2015;314:1039–51.[PubMed] [Google Scholar]
5. Sullivan BA, McClure C, Hicks J, Lake DE, Moorman JR, Fairchild KD. Early heart rate characteristics predict death and morbidities in preterm infants. J Pediatr. 2016;174:57–62.[PubMed] [Google Scholar]

6. Rowe M. An introduction to machine learning for clinicians. Acad Med. 2019;94:1433–6.
7. Beam AL, Kohane IS. Big data and machine learning in health care. JAMA 2018;319:1317–8..[PubMed] [Google Scholar]
8. Australian Institute of Health and Welfare. (2020). Rural and remote health. https://www.aihw.gov.au/reports/ australias- health/rural-and-remote-health[Google Scholar]
9. "ServiceNow Implementation in Healthcare: A Case Study" – Journal of Healthcare Informatics
10. Healthc Manag 2021 Jan 15;14(1):280-289. 4. Frank SR. Digital health care--the convergence of health care and the internet. J Ambul Care Manag 2000 Apr;23(2):8-17. [FREE Full text] [CrossRef] [Medline]