

# Safe Care for Pediatric Patients: A Risk Management Study in Pediatric Wards

Mae Ann Grace J. Estabillo, Man, Msn, Claire R. Reginalde, Ph.D.

College of Business Education, Nueva Vizcaya State University, Bagabag, Nueva Vizcaya, Philippines

DOI: <https://doi.org/10.47772/IJRISS.2026.100500626>

Received: 24 May 2026; Accepted: 29 May 2026; Published: 09 June 2026

## ABSTRACT

This study aimed to identify and assess the risks present in the Pediatric Ward of a hospital in Region II, Philippines, and develop appropriate risk management and mitigation strategies to improve patient safety and healthcare quality. The study utilized a descriptive qualitative research design and employed document review, group discussions, and direct observation in data gathering. Risk management tools such as SWOT Analysis, PESTLE Analysis, Risk Matrix, and Risk Register were used to analyze internal and external factors affecting the Pediatric Ward and to identify potential clinical and operational risks. Findings revealed several strengths, including adequate staffing, willingness of personnel to learn, availability of medical equipment and supplies, established quality management systems, and effective patient cohorting practices. Opportunities identified included available trainings, government healthcare initiatives, technological advancements, and financial assistance programs. However, weaknesses such as limited pediatric emergency training, health record deficiencies, punitive reporting culture, poor ventilation, and increasing employee turnover were also identified. External threats included healthcare worker migration, budget constraints, cyber threats, emerging infectious diseases, and natural disasters. Risk Register analysis identified major risks such as needle stick injuries, medication errors, delayed patient care due to unavailable equipment and supplies, compromised staffing, poor ventilation, and documentation deficiencies. These risks highlighted the need for continuous monitoring, staff development, preventive maintenance, occupational safety practices, and efficient resource management. The study concluded that a comprehensive risk management plan is essential in strengthening patient safety, improving healthcare quality, and ensuring operational efficiency in the Pediatric Ward through proactive identification, assessment, and mitigation of risks.

**Keywords:** risk management, pediatric ward, SWOT analysis, PESTLE analysis, & risk register

## BACKGROUND and Review of Related Literature

Risk management has become an essential component of organizational operations across various sectors, including business, education, and healthcare. In healthcare settings, risk management is particularly important because adverse events may result in patient injury, disability, or death. Patient safety and risk management initiatives aim to identify, assess, and mitigate hazards that may compromise healthcare quality and outcomes (World Health Organization, 2021).

Clinical risk refers to the possibility that a patient may experience unintended harm during the delivery of healthcare services. Consequently, clinical risk management plays a vital role in ensuring patient safety and improving the quality of care, especially in high-risk areas such as pediatric wards where patients require close monitoring and specialized interventions.

Healthcare systems are inherently complex due to the integration of advanced technologies, multidisciplinary healthcare teams, and continuous patient interactions. These complexities increase the likelihood of medical errors and adverse outcomes if risks are not properly identified and controlled. Healthcare professionals are therefore expected not only to provide effective treatment but also to prevent avoidable incidents that may compromise patient safety. Effective risk management enables healthcare institutions to identify potential

hazards, assess their impact, and implement preventive measures to minimize risks and improve healthcare outcomes (World Health Organization, 2021; Rodziewicz et al., 2024).

Children are among the most vulnerable populations in healthcare institutions because of their developmental stage, dependence on caregivers, and sensitivity to medications and treatments. Pediatric patients require continuous monitoring and specialized safety measures to reduce exposure to preventable harm. In pediatric wards, medication administration, patient falls, infection control, and procedural errors remain among the most common sources of risk. Medication-related errors, in particular, continue to be one of the leading causes of preventable adverse events among children. Studies have shown that structured medication safety programs, standardized procedures, and effective reporting systems significantly reduce medication errors and improve patient safety outcomes (Rodziewicz et al., 2024).

Recent literature emphasizes that risk management should not only focus on responding to incidents but also on proactive identification and prevention of hazards before they occur. According to the World Health Organization (2021), patient safety programs that incorporate risk assessment, staff training, incident reporting, and continuous quality improvement contribute to safer healthcare environments and better patient outcomes. Healthcare institutions with comprehensive risk management systems demonstrate improved organizational performance, enhanced patient trust, and reduced costs associated with preventable incidents (World Health Organization, 2021).

In the Philippines, the implementation of risk management programs in healthcare institutions has gradually expanded in response to increasing demands for patient safety and quality healthcare services. Hospitals apply risk management strategies in areas such as patient care, disaster preparedness, occupational safety, and infection prevention. Despite these efforts, many healthcare facilities still face challenges in implementing comprehensive and well-documented risk management frameworks. The Department of Health has emphasized the importance of institutional patient safety programs, continuous staff training, and quality improvement initiatives to strengthen healthcare delivery and reduce preventable adverse events (Department of Health Philippines, 2023).

## Methods

The study employed a descriptive qualitative research design to identify, assess, and analyze potential risks in the Pediatric Ward and to develop corresponding treatment and mitigation strategies. The descriptive approach was appropriate as it explored existing risks, determined gaps in current practices, and illustrated the implementation of risk management within the area. Qualitative methods were utilized to gain a comprehensive understanding of issues affecting pediatric healthcare services and organizational processes. According to John W. Creswell and J. David Creswell (2018), qualitative research is appropriate for exploring complex phenomena within their natural settings and understanding participants' perspectives regarding existing practices and challenges.

A mixed-method approach involving document review, group discussions, and direct observation was conducted from January to June 2024. Participants were selected through purposive sampling and included fourteen healthcare personnel assigned to the Pediatric Ward, composed of twelve nurses, one midwife, and one nursing attendant, due to their direct involvement in patient care and ward operations. Data validation was achieved through triangulation of findings from observations, staff discussions, and hospital records to ensure consistency and reliability of identified risks.

Risk assessment utilized a 3×3 Risk Matrix and Risk Register. Risk matrices are widely recognized tools in organizational risk management for categorizing risks according to their likelihood of occurrence and potential impact. The framework aligns with principles outlined in International Organization for Standardization ISO 31000:2018 and by Paul Hopkin (2018), which recommend systematic risk identification, analysis, evaluation, and treatment. Probability ratings were determined using the frequency of occurrence of incidents observed in the ward, documented reports, and staff experiences, while severity ratings were based on the potential impact on patient safety, staff safety, and hospital operations. Risks were classified as low, medium, or high according to their computed inherent ratings. Quantitative indicators such as the frequency of needle stick injuries,

medication errors, staffing turnover, documentation deficiencies, and equipment or supply unavailability were also reviewed from incident reports and ward records to support risk prioritization.

SWOT and PESTLE analyses were further utilized to examine internal and external factors affecting the Pediatric Ward. SWOT analysis evaluated strengths, weaknesses, opportunities, and threats related to manpower, materials, methods, environment, and technology. According to Emet Gürel and Meral Tat (2017), SWOT analysis remains an effective strategic planning tool for identifying organizational capabilities and challenges. PESTLE analysis examined political, economic, social, technological, legal, and environmental influences affecting healthcare operations. As discussed by Rohana Perera (2017), PESTLE analysis provides a structured framework for assessing external environmental factors that may influence organizational performance and decision-making. Together, these tools strengthened the analytical depth of the study and guided the development of a comprehensive risk management plan for the Pediatric Ward.

## RESULTS AND DISCUSIONS

### Internal & External Issues Using Swot Analysis

This section presents the SWOT analysis of internal and external issues in pediatric ward in a hospital in Region 02, Philippines. The SWOT Analysis was sub-divided into the areas of Man (Human Resource); Money; Machine; Methods; Measurements; Environments; and Technology.

#### SWOT Analysis on Man (Human Resource)

The SWOT analysis showed that the Pediatric Ward possesses manpower strengths that support quality pediatric care, including willingness of staff to learn, competence in basic nursing skills, good communication, and adequate staffing. These factors contribute to improved patient safety and healthcare outcomes (WHO, 2021; Aloweni et al., 2022). However, weaknesses such as limited Pediatric Advanced Life Support (PALS) competence, lack of initiative, punitive reporting culture, employee turnover, and increasing inexperienced staff may compromise patient care and emergency response. Studies indicate that specialized training and supportive workplace cultures improve patient safety and staff performance (Kang et al., 2021; Rodziewicz et al., 2022). Opportunities included pediatric-related trainings and external nursing applicants, while threats involved healthcare worker migration and better compensation abroad, which may contribute to staffing shortages and operational challenges.

Table 1. SWOT analysis on man.

| Strength                                                                                                                                                                                                                                                                                                                                                                                            | Weakness                                                                                                                                                                                                                                                                                                                                                                                                                 | Opportunities                                                                                                                                                    | Threat                                                                                                                                                                                                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>Willingness of staffs to learn new nursing knowledge</li> <li>Have good basic nursing skills like intravenous insertion, and blood transfusion</li> <li>Most staffs have good communication skills</li> <li>Enough staffing for tertiary hospitals in accordance to Revised Organizational Structure and Staffing Standards for Level III General</li> </ul> | <ul style="list-style-type: none"> <li>Lack of knowledge and competence of personnel in providing advance life support specifically patterned with pediatric care</li> <li><i>Mañana</i> habit and lack of initiative to carry out nursing skills or care</li> <li>Punitive culture which affects reporting of adverse or sentinel events that occur in the area</li> <li>New staff with no previous hospital</li> </ul> | <ul style="list-style-type: none"> <li>Availability of trainings applicable for pediatric care</li> <li>Outsider applicants under the Nursing Service</li> </ul> | <ul style="list-style-type: none"> <li>Better compensation abroad where trained personnel prefer to work</li> <li>Transfer of COS to new hospitals or clinics of fellow doctors with pediatric care service</li> </ul> |

| Strength                     | Weakness                                                                                           | Opportunities | Threat |
|------------------------------|----------------------------------------------------------------------------------------------------|---------------|--------|
| Government Hospitals of 2022 | experience outnumber the experienced personnel<br>▪ Increasing number of trained employee turnover |               |        |

### SWOT Analysis on Money

The SWOT analysis on financial resources revealed that the Pediatric Ward benefits from allocated organizational funds and financial donations from private and public sectors, which support healthcare operations and pediatric service delivery. Adequate financing strengthens operational capacity, improves resource availability, and contributes to the delivery of quality healthcare services. According to the World Health Organization (2021), sustainable financing is a critical component of resilient health systems and is essential for maintaining patient safety, service quality, and workforce capacity. However, improper allocation of expenditures due to inadequate needs assessment was identified as a weakness that may contribute to resource inefficiencies, delayed procurement, and interruptions in service delivery. Potential budget reductions from the Department of Budget and Management (DBM) were also identified as threats that may affect staffing levels, procurement activities, and continuity of healthcare services. Previous studies have highlighted that insufficient and inefficient healthcare financing remains a significant challenge affecting hospital performance, service accessibility, and the sustainability of healthcare systems, particularly in low- and middle-income countries (World Health Organization, 2021; World Bank, 2022).

Table 2. SWOT analysis on money.

| Strength                                                | Weakness                              | Opportunities                                                          | Threat                                                                       |
|---------------------------------------------------------|---------------------------------------|------------------------------------------------------------------------|------------------------------------------------------------------------------|
| ▪ Availability of allocated funds from the organization | ▪ Improper allocation of expenditures | ▪ Monetary donations from private/public organizations and individuals | ▪ Cutting of budget from the Department of Budget and Management (DBM) level |

### SWOT Analysis on Machine

The SWOT analysis on machine resources showed that the Pediatric Ward benefits from technologically advanced equipment, including syringe pumps, infusion pumps, vein illuminators, and pediatric ventilators, which support safe and effective pediatric care. Reliable medical equipment is essential for reducing clinical errors, enhancing patient safety, and improving healthcare outcomes. According to the World Health Organization (2021), access to safe, effective, and quality-assured medical devices is a fundamental component of healthcare service delivery. However, weaknesses were identified in the procurement process under Republic Act No. 9184, which prioritizes the Lowest Calculated Responsive Bid (LCRB). While this approach promotes cost efficiency and transparency, it may sometimes result in the acquisition of equipment that does not fully meet long-term performance and reliability requirements. Complex equipment operation was also identified as a limitation among some healthcare personnel, emphasizing the need for continuous training and competency development. Opportunities included donations and the increasing availability of user-friendly advanced healthcare technologies that may enhance service delivery. Conversely, threats involved the acquisition of more advanced and higher-quality equipment by competing healthcare facilities, which may influence patient preference and organizational competitiveness. Previous studies have shown that investment in modern medical technologies contributes to improved healthcare quality, operational efficiency, patient satisfaction, and institutional performance (OECD, 2022; Kruk et al., 2018).

Table 3. SWOT analysis on machine.

| Strength                                                                                                                                                                                                                     | Weakness                                                                                                                                                                                                                                                                                                    | Opportunities                                                                                                                                                                          | Threat                                                                                                                                                                                                                                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>Availability of technologically advanced equipment in giving care to patients (syringe pump, infusion pump, vein illuminator, ventilators specific for pediatric patients)</li> </ul> | <ul style="list-style-type: none"> <li>Low quality of received equipment due to RA 9184 Government Procurement Reform Act stating that in all cases, the contract shall be awarded only to the bidder with the Lowest Calculated Responsive Bid (LCRB)</li> <li>Complex instruction of operation</li> </ul> | <ul style="list-style-type: none"> <li>Donations from private or public sectors/ individuals</li> <li>Availability of user-friendly advance medical equipment in the market</li> </ul> | <ul style="list-style-type: none"> <li><b>INTRODUCTION</b> of advanced equipment and technology specific for pediatric patients by other hospital or clinics such as 2D echo</li> <li>Availability of higher quality of equipment offered in other hospital or clinics</li> </ul> |

### SWOT Analysis on Materials

The SWOT analysis on materials revealed that the Pediatric Ward benefits from the availability of updated medical supplies, dedicated procurement funds, and limited vaccine supplies for employees, which support timely interventions and continuity of pediatric care. Donations from private and public sectors and consignment agreements with suppliers further strengthened resource availability. In healthcare risk management, adequate and accessible medical supplies are essential for preventing treatment delays, ensuring continuity of care, and maintaining patient safety. The World Health Organization (2021) emphasizes that the availability of safe and quality-assured health products is a fundamental component of effective healthcare delivery.

However, weaknesses were identified in the procurement of low-quality supplies associated with Republic Act No. 9184, which prioritizes the Lowest Calculated Responsive Bid (LCRB). Limited vaccine availability for employees was also noted. Research has shown that procurement decisions based primarily on cost considerations may affect the quality, reliability, and long-term value of healthcare supplies, potentially influencing patient safety and service delivery outcomes (OECD, 2022; World Health Organization, 2021). Threats included delayed procurement processes and the availability of higher-quality supplies in competing healthcare facilities, which may affect patient trust and organizational competitiveness. Consistent with previous studies, healthcare institutions with reliable and high-quality medical resources are more likely to achieve better patient satisfaction, operational efficiency, and healthcare outcomes (Kruk et al., 2018; OECD, 2022).

Table 4. SWOT analysis on materials.

| Strength                                                                                                                                                                                            | Weakness                                                                                                                                                                                                                                                              | Opportunities                                                                                                                                                      | Threat                                                                                                                                                                            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>Updated medical supplies (glucometer strip and lancet, tracheostomy tube, etc.)</li> <li>Availability of funds to procure needed medical supplies</li> </ul> | <ul style="list-style-type: none"> <li>Low quality of received supplies due to RA 9184 Government Procurement Reform Act stating that that in all cases, the contract shall be awarded only to the bidder with the Lowest Calculated Responsive Bid (LCRB)</li> </ul> | <ul style="list-style-type: none"> <li>Donations of equipment from private or public sectors/ individuals</li> <li>Available consignment with suppliers</li> </ul> | <ul style="list-style-type: none"> <li>Availability of better quality of medical supplies in pharmacies/ clinics/ hospitals outside R2TMC</li> <li>Delayed procurement</li> </ul> |

| Strength                                                                                                    | Weakness                                                                                  | Opportunities | Threat                                                                                                                                   |
|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>Availability of some vaccines for the health of employees</li> </ul> | <ul style="list-style-type: none"> <li>Limited types of vaccines for employees</li> </ul> |               | <ul style="list-style-type: none"> <li>process of medical supplies as stipulated in RA 9184 Government Procurement Reform Act</li> </ul> |

### SWOT Analysis on Methods

The SWOT analysis on methods demonstrated that the Pediatric Ward has established operational and quality management mechanisms, including ward policies, Quality Management System (QMS) procedures, work instructions, and continuous quality improvement initiatives. The implementation of standardized Nursing Practice Guidelines (NPGs) and Clinical Practice Guidelines (CPGs) supports evidence-based pediatric care and aligns with healthcare risk management principles that emphasize standardization, protocol adherence, and continuous quality improvement to reduce clinical errors and improve patient outcomes (World Health Organization, 2021; Agency for Healthcare Research and Quality [AHRQ], 2023).

Opportunities were identified through government policies such as Republic Act No. 11332 on mandatory disease reporting and Department of Health issuances reinforcing patient safety and quality healthcare practices. These policies strengthen disease surveillance systems, support timely reporting of public health events, and enhance institutional preparedness for emerging health threats. However, weaknesses were noted in the inconsistent review and updating of policies, QMS procedures, and work instructions according to the prescribed document review schedule. Inadequate policy review may affect regulatory compliance, operational consistency, and responsiveness to emerging healthcare risks. Threats included emerging infectious and contagious diseases that may compromise staff health, increase workload demands, and disrupt healthcare operations. Consistent with previous studies, healthcare institutions with updated protocols, effective infection prevention measures, and strong emergency preparedness systems are better equipped to maintain service continuity and patient safety during public health emergencies (Centers for Disease Control and Prevention [CDC], 2022; World Health Organization, 2021).

Table 5. SWOT analysis on methods.

| Strength                                                                                                                                                                                                                                                   | Weakness                                                                                                                                                     | Opportunities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Threat                                                                                                                                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>Presence of specific ward policies, quality management system procedures, and work instructions</li> <li>With continuous improvement initiatives to improve the service and operations of Pediatric Ward</li> </ul> | <ul style="list-style-type: none"> <li>Failure to follow the document review schedule (DRS) of policies and QMS procedures, and work instructions</li> </ul> | <ul style="list-style-type: none"> <li>Issuance of RA 11332 regarding the reporting of highly notifiable diseases which facilitates surveillance, thereby giving more attention to address such incidence</li> <li>Issuance of Memorandum from the Department of Health to reinforce the patient safety of hospitals, which gives concern to patient safety issues including pediatric patients.</li> <li>Implementation of Nursing Practice Guidelines Clinical Practice Guidelines on Pediatric Care in hospitals from the DOH</li> </ul> | <ul style="list-style-type: none"> <li>Emerging infectious or contagious diseases outside the hospital affecting the health of the staff</li> </ul> |

## SWOT Analysis on Measurement

The SWOT analysis on measurement demonstrated that the Pediatric Ward maintains effective performance monitoring through compliance with Key Performance Indicators (KPIs), particularly timely patient discharge, active participation in accreditation programs, and implementation of rewards and recognition systems. These practices support operational efficiency, staff motivation, accountability, and continuous quality improvement, which are fundamental principles of healthcare quality management (World Health Organization, 2021; Organisation for Economic Co-operation and Development [OECD], 2022). Opportunities included Department of Health standards and incentive programs that promote service quality and institutional performance.

However, increasing health record deficiencies were identified as a major weakness that may compromise patient safety, continuity of care, clinical decision-making, and legal compliance. Accurate and complete documentation is essential for effective communication among healthcare providers, quality monitoring, and patient safety initiatives. Threats included the implementation of Republic Act No. 9439, which may affect hospital revenue generation and employee incentive programs. These findings highlight the importance of maintaining robust documentation systems and effective performance monitoring mechanisms to ensure safe, efficient, and high-quality pediatric healthcare services. Previous studies have shown that healthcare organizations with strong performance measurement systems and accurate clinical documentation are more likely to achieve better patient outcomes, regulatory compliance, and organizational effectiveness (World Health Organization, 2021; Agency for Healthcare Research and Quality, 2023).

Table 6. SWOT analysis on measurement.

| Strength                                                                                                                                                                                                                                                                                                                                                                    | Weakness                                                                                                                                                       | Opportunities                                                                                                                                                                                                                                                                              | Threat                                                                                                                                                                                                                                           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>Meeting of Key Performance Indicator (KPI) which is the discharging of patients within 4 hours after the physician writes his discharge orders.</li> <li>Availability of rewards and recognition</li> <li>Active participation in accreditations like Pediatric Department Specialty Accreditation, ISO 9001:2015 and PGS</li> </ul> | <ul style="list-style-type: none"> <li>Increasing number of health record deficiencies which reflects deficiencies in the care provided to patients</li> </ul> | <ul style="list-style-type: none"> <li>DOH setting the discharge turnaround time to 6 hours</li> <li>Presence of rewards or incentives for achieving objectives and good quality of service (Philippine Integrative Traditional and Alternative Health Care Seal of Excellence)</li> </ul> | <ul style="list-style-type: none"> <li>Release of RA 9439 which stipulates the prohibition of detention of patients who cannot pay their bills</li> <li>Patients not paying their bills affecting the performance reward of employees</li> </ul> |

## SWOT Analysis on Environment

The SWOT analysis on environment demonstrated strengths in infection prevention and environmental management through the availability of isolation rooms, proper patient cohorting areas, and a dedicated Treatment Room for specialized procedures. These measures support infection control, patient safety, and procedural privacy, aligning with healthcare risk management principles promoting safe clinical environments (WHO, 2021; CDC, 2022). Opportunities included Department of Health recognition programs on environmental sanitation. However, weaknesses such as poor ventilation, enclosed ward location, and the presence of stray cats may increase infection and environmental health risks. Threats including flooding and landslides may also disrupt healthcare operations and compromise patient safety. Similar studies emphasized the importance of safe healthcare environments and disaster preparedness in maintaining continuity and quality of care (UNDRR, 2021).

Table 7. SWOT analysis on environment.

| Strength                                                                                                                                                                                                           | Weakness                                                                                                                                                                                                           | Opportunities                                                                                                                                                                          | Threat                                                                                             |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>▪ Presence of Isolation Rooms</li> <li>▪ Availability of rooms for proper cohorting of patients</li> <li>▪ Availability of Treatment Room for special procedures</li> </ul> | <ul style="list-style-type: none"> <li>▪ Area is situated in enclosed and low elevated space, with no enough ventilation for patients</li> <li>▪ Presence of cat inside the area at any time of the day</li> </ul> | <ul style="list-style-type: none"> <li>▪ Availability of awards on maintaining environmental sanitation from DOH (Green Viability Assessment System Award, DOH Star Awards)</li> </ul> | <ul style="list-style-type: none"> <li>▪ Flood and landslide prone location of the ward</li> </ul> |

### SWOT Analysis on Technology

The SWOT analysis on technology demonstrated that the Pediatric Ward benefits from the availability of the Integrated Hospital Operations and Management Information System (iHOMIS), which supports patient data management, clinical documentation, information sharing, and healthcare coordination. The availability of instructors and technical experts further enhanced opportunities for staff training and adaptation to emerging digital technologies. The integration of health information systems has been recognized as an important strategy for improving healthcare efficiency, data quality, and continuity of care (World Health Organization, 2021).

However, limited staff competency in utilizing the system may affect workflow efficiency and the optimal use of digital health technologies. Continuous training and capacity-building initiatives are therefore necessary to maximize the benefits of electronic health information systems. The potential risk of cyberattacks and information leakage was also identified as a significant threat that may compromise patient confidentiality, disrupt healthcare operations, and reduce organizational trust. Recent studies have highlighted the growing importance of digital literacy, information security, and cybersecurity preparedness in protecting healthcare information systems and ensuring safe healthcare delivery (World Health Organization, 2021; World Health Organization, 2023; National Institute of Standards and Technology [NIST], 2024).

Table 8. SWOT analysis on technology.

| Strength                                                                                                                                                 | Weakness                                                                                    | Opportunities                                                                                                     | Threat                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>▪ Availability of management information system (iHOMIS) software to generate and input patient's data</li> </ul> | <ul style="list-style-type: none"> <li>▪ Lack of knowledge in using the software</li> </ul> | <ul style="list-style-type: none"> <li>▪ Availability of instructors and experts to use the technology</li> </ul> | <ul style="list-style-type: none"> <li>▪ Leakage of information through cyber attacks</li> </ul> |

### External Issues Using PESTEL Analysis

The PESTLE analysis identified key external factors influencing the operations and risk environment of the Pediatric Ward. Political support from local government units and Department of Health programs, including specialized pediatric healthcare initiatives, strengthened healthcare accessibility and service delivery. Government support and health system investments play a significant role in improving healthcare capacity, patient access, and quality of care (World Health Organization, 2021).

Economically, programs such as the Malasakit Center reduced the financial burden on patients and improved access to healthcare services, while the economic growth of Nueva Vizcaya created opportunities for enhanced healthcare investments and resource availability. Nevertheless, global and national economic uncertainties remain potential threats that may affect healthcare financing, procurement, and workforce sustainability (World Bank, 2022).

Social acceptance of pediatric healthcare services supported healthcare utilization and community engagement. However, delayed healthcare-seeking behavior among families may contribute to preventable complications, delayed treatment, and poorer pediatric health outcomes. Previous studies have shown that timely access to healthcare services is a critical determinant of child health and survival, particularly in low- and middle-income settings (United Nations Children's Fund [UNICEF], 2023; World Health Organization, 2021).

Technological opportunities included the availability of advanced medical equipment and healthcare information systems that enhanced diagnostic capability, treatment effectiveness, and service delivery efficiency. Legal frameworks such as Republic Act No. 9173 (Philippine Nursing Act of 2002) and Republic Act No. 7610 (Special Protection of Children Against Abuse, Exploitation and Discrimination Act) strengthened professional standards, patient protection, and accountability within healthcare institutions. However, these regulations also increase the need for compliance and may expose healthcare providers to legal liabilities when standards of care are not met.

Environmentally, proposed government support for the construction of a separate Pediatric Building may improve healthcare infrastructure, patient safety, and disaster preparedness. However, natural disasters such as typhoons, floods, earthquakes, and other environmental hazards remain significant threats that may disrupt healthcare operations and compromise patient safety. These findings underscore the importance of adaptive and proactive risk management strategies to ensure the continuity and quality of pediatric healthcare services.

Table 9. PESTEL Analysis in the Pediatric Ward

| Area          | Opportunities                                                                                                                                                                                                                                                                                                                           | Threats                                                                                                            |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| Political     | <ul style="list-style-type: none"> <li>Support from the Municipal and Provincial Local Government Unit of Nueva Vizcaya</li> <li>DOH AO 2021 No. 2021 – 004 which supports the Implementation of the Pediatric Access to Liver Transplantation (PAsLiT) Hub Project</li> </ul>                                                          |                                                                                                                    |
| Economic      | <ul style="list-style-type: none"> <li>Presence of Malasakit Center which will pay for patients' hospital bills</li> <li>Nueva Vizcaya registered the fastest growth in Economic Performance of Provinces in Cagayan Valley with 13.1% in the Philippine Statistics Authority Report 2022</li> </ul>                                    | Global war and crisis                                                                                              |
| Social        | <ul style="list-style-type: none"> <li>Acceptance of the community on the pediatric services provided</li> </ul>                                                                                                                                                                                                                        | Culture of bringing patients to health care facilities once they are already in advance/ critical stage of illness |
| Technological | <ul style="list-style-type: none"> <li>Availability of technologically advanced equipment and software in the market</li> </ul>                                                                                                                                                                                                         |                                                                                                                    |
| Legal         | <ul style="list-style-type: none"> <li>Presence of Republic Act 9173 which stipulates the proper protection and improvement of the nursing profession</li> <li>RA 7610 which is an act providing for stronger deterrence and special protection against child abuse, exploitation and discrimination, and for other purposes</li> </ul> | Lawsuit by the parents and relatives of patients on the quality of service delivered                               |
| Environmental | <ul style="list-style-type: none"> <li>Possible donations of local/ national government for the construction of a Pediatric Building</li> </ul>                                                                                                                                                                                         | Presence of disasters                                                                                              |

### Risk Register

This section discusses the different risks identified in the Pediatric Ward of a hospital in Region II, Philippines. The identification of these risks was based on the SWOT and PESTLE analyses conducted. Each identified risk included the probability of occurrence, severity of impact, risk rating (derived from multiplying the probability and severity scores), and level of risk. Furthermore, corresponding action plans, mitigation plans, target dates, and expected outcomes were presented.

#### Risk 1: Needle stick injury because of non-compliance of staff with the procedure standard

The study identified needle stick injury (NSI) as a high-risk concern in the Pediatric Ward due to non-compliance with standard safety procedures. The risk obtained a high probability score (3) and high severity score (3), resulting in a high-risk rating (9). This finding is consistent with previous studies reporting that needle stick injuries remain a significant occupational hazard among healthcare workers and increase the risk of transmission of bloodborne pathogens such as hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV) (Centers for Disease Control and Prevention [CDC], 2022; World Health Organization, 2022). To address this risk, incidents should be reported to the Occupational Health Committee for assessment and investigation, while affected personnel should receive immediate evaluation and intervention from the Employees’ Clinic. Mitigation strategies include regular occupational safety training, reinforcement of infection prevention and control practices, adherence to standard precautions, and proper disposal of used sharps to maintain workplace safety. Evidence indicates that continuous monitoring, staff education, access to safety-engineered devices, and compliance with occupational health protocols are essential in reducing needle stick injuries and protecting both healthcare workers and patients (World Health Organization, 2022; Occupational Safety and Health Administration [OSHA], 2024).

Table 10. Risk Register for the Risk on “Needle stick injury because of non-compliance of staff with the procedure standard”.

| RISK/ OPPORTUNITY EVENT                                                             | Probability | Severity | Inherent Rating | Level | Actions Plan                                                                                                                   | Mitigation Plan                                                                                                                                   | Target Date | Expected Outcome                              |
|-------------------------------------------------------------------------------------|-------------|----------|-----------------|-------|--------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-----------------------------------------------|
| Needle stick injury because of non-compliance of staff with the procedure standard. | 3           | 3        | 9               | High  | 1. Report to the Occupational Safety Committee.<br>2. Refer to the Employee's Clinic for assessment and needed intervention/s. | 1. Attending to occupational and patient safety seminars.<br>2. Religious reminder on proper waste segregation and organization in the workplace. | Every shift | Safe delivery of care for patients and staff. |

#### Risk 2: Inefficient patient care because of health record deficiencies

The study identified inefficient patient care due to health record deficiencies as a high-risk concern, with a high probability score (3) and a high severity score (3), resulting in an inherent risk rating of 9. Incomplete or inaccurate documentation may lead to inappropriate clinical decisions, compromised continuity of care, increased healthcare costs, communication failures among healthcare providers, and potential legal implications. Previous studies have demonstrated that deficiencies in patient records are associated with reduced quality of care and increased patient safety risks (Institute of Medicine, 2007; World Health Organization, 2021).

To address this risk, immediate correction of identified deficiencies and the conduct of root cause analysis were recommended when corrections are not possible. Additional mitigation measures included regular documentation seminars, strict auditing of health records, and continuous monitoring during every shift to ensure accurate, complete, and timely documentation. Evidence suggests that strengthening documentation practices through standardized procedures, routine audits, staff education, and the effective use of electronic health record systems can significantly improve patient safety, continuity of care, and healthcare quality (Agency for Healthcare Research and Quality [AHRQ], 2023; World Health Organization, 2021).

Table 11. Risk Register for the Risk on “Inefficient patient care because of health record deficiencies”.

| RISK/ OPPORTUNITY EVENT                                         | Probability | Severity | Inherent Rating | Level | Actions Plan                                                                                                                                                                                                                      | Mitigation Plan                                                                                                                          | Target Date | Expected Outcome       |
|-----------------------------------------------------------------|-------------|----------|-----------------|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------------------|
| Inefficient patient care because of health record deficiencies. | 3           | 3        | 9               | High  | 1. Correction of possible deficiencies, if possible. Conduct of root cause analysis if correction of deficiency is not possible.<br>2. Monitoring and analysis of the impact of deficiencies to patients and to the organization. | 1. Attend to documentation-related seminars.<br>2. Religious auditing of health record before letting the said document out of the area. | Every shift | Accurate patient care. |

### Risk 3: Compromised staffing because of increasing number of employee turnover

The study identified compromised staffing due to increasing employee turnover as a medium-level risk, with a high probability score (3) and a low severity score (1), resulting in an inherent risk rating of 3. High staff turnover may negatively affect healthcare delivery, increase workload among remaining personnel, reduce continuity of care, and weaken organizational efficiency. Previous studies have shown that nurse turnover is associated with staffing shortages, increased job stress, burnout, reduced teamwork, and poorer patient outcomes (Hayes et al., 2012; World Health Organization, 2021).

To address this risk, proposed actions included hiring additional staff, orienting and capacitating newly hired personnel, and augmenting workforce support from staff with pediatric care training. Mitigation measures also included identifying employees with intentions to resign, updating the Pediatric Ward Quality Management System to facilitate orientation, developing orientation checklists, and conducting periodic staff assessments and counseling. Regular quarterly monitoring was recommended to support workforce stability and maintain quality pediatric care. Recent evidence emphasizes that supportive work environments, effective onboarding programs, professional development opportunities, and staff retention strategies are essential for reducing turnover and strengthening healthcare workforce capacity (World Health Organization, 2021; International Council of Nurses, 2022).

Table 12. Risk Register for the Risk on “Compromised staffing because of increasing number of employee turnover”.

| RISK/ OPPORTUNITY EVENT                                                | Probability | Severity | Inherent Rating | Level  | Actions Plan                                                                                                                                             | Mitigation Plan                                                                                                                                                                                                                                                                                                       | Target Date   | Expected Outcome                                                                  |
|------------------------------------------------------------------------|-------------|----------|-----------------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------------------------------------------------------------------------------|
| Compromised staffing because of increasing number of employee turnover | 3           | 1        | 3               | Medium | 1. Request for hiring of new staff.<br>2. Orient/ capacitate newly hired staff.<br>3. Augment from other areas with previous training on pediatric care. | 1. Identify number of staff with intentions of resigning.<br>2. Present list to the Nursing Division.<br>3. Update the QMS for Pediatric Ward for easy orientation to newly hired staff.<br>4. Craft a checklist to facilitate smooth orientation for new staff.<br>5. Periodic assessment and counselling for staff. | Every quarter | Stable staffing.<br>Immediate hiring of replacement staff.<br>Well-trained staff. |

### Risk 4: Care is delayed because of non-functioning and unavailable equipment

The study identified delayed patient care due to non-functioning or unavailable equipment as a medium-level risk, with both probability and severity rated at 2. Delays in equipment availability may compromise timely diagnosis and treatment, disrupt healthcare workflows, reduce patient satisfaction, and negatively affect healthcare outcomes. To address this risk, proposed actions included submitting repair requests to the Engineering and Facilities Management Department (EFMD) and borrowing available equipment from other hospital units when necessary. Mitigation strategies involved periodic calibration, preventive maintenance, the provision of spare equipment, and regular monitoring of equipment utilization and lifespan.

Evidence suggests that inadequate maintenance systems, equipment downtime, and shortages of essential medical devices can significantly impair healthcare service delivery, particularly in resource-constrained settings where maintenance capacity and replacement resources may be limited (World Health Organization, 2021; Perry & Malkin, 2011). The World Health Organization further emphasizes that effective medical equipment management systems, preventive maintenance programs, and lifecycle monitoring are critical to ensuring the safety, reliability, and continuous availability of healthcare technologies necessary for quality patient care (World Health Organization, 2021).

Table 13. Risk Register for the Risk on “Care is delayed because of non-functioning and unavailable equipment”

| RISK/ OPPORTUNITY EVENT                                               | Probability | Severity | Inherent Rating | Level  | Actions Plan                                                                                                                                          | Mitigation Plan                                                                                                                                                                  | Target Date | Expected Outcome                                                                          |
|-----------------------------------------------------------------------|-------------|----------|-----------------|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------------------------------------------------------------------------------------|
| Care is delayed because of non-functioning and unavailable equipment. | 2           | 2        | 4               | Medium | 1. Make a request for action and send equipment to Engineering and Facilities Department.<br>2. Borrow from other areas who have available equipment. | 1. Periodic calibration and preventive maintenance of machine.<br>2. Allocate a spare equipment if possible.<br>3. Monitor and analyze needed equipment and their span of usage. | Quarterly   | Rendering of expected service within the shift.<br>Immediate return of equipment for use. |

### Risk 5: Delayed patient care because of unavailability of medical supplies

The study identified the unavailability of medical supplies resulting in delayed patient care as a medium-level risk, with both probability and severity rated at 2. Insufficient medical supplies may delay procedures, diagnostic tests, and treatment interventions, potentially worsening patient conditions and affecting healthcare efficiency. Supply shortages may also increase patient dissatisfaction and reduce staff productivity due to time spent locating alternative resources. To address this risk, proposed actions included emergency procurement requests and borrowing supplies from other hospital units to ensure continuity of care. Mitigation measures involved maintaining buffer stock supplies, implementing inventory control measures, and regularly monitoring expiration dates to prevent shortages.

Effective inventory management and supply chain monitoring are critical components of healthcare operations and patient safety. The World Health Organization (2021) emphasizes that the continuous availability of essential medical products is necessary for safe and effective healthcare delivery. Similarly, research has demonstrated that efficient supply chain management, accurate forecasting, and strategic inventory control contribute to uninterrupted healthcare services, reduced operational disruptions, and improved patient outcomes (Yadav, 2015; World Health Organization, 2021). Regular monitoring and resource planning also help healthcare institutions minimize the risks associated with supply shortages and ensure continuity of care.

Table 14. Risk Register for the Risk on “Delayed patient care because of unavailability of medical supplies”.

| RISK/ OPPORTUNITY EVENT                                             | Probability | Severity | Inherent Rating | Level  | Actions Plan                                                                                                               | Mitigation Plan                                                                                                                | Target Date | Expected Outcome                                                     |
|---------------------------------------------------------------------|-------------|----------|-----------------|--------|----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|-------------|----------------------------------------------------------------------|
| Delayed patient care because of unavailability of medical supplies. | 2           | 2        | 4               | Medium | 1. Request for a emergency purchase of medical supplies needed.<br>2. Borrow from other areas with the available supplies. | 1. Allocate a supply stock to be used during unavailability in the hospital.<br>2. Monitoring of expiration dates of supplies. | Quarterly   | Availability of supplies and provision of supplies within the shift. |

### Risk 6: Injury or acquisition of illness of patients, relatives, and staffs because of enclosed and low elevated space, with no enough ventilation for patients

The study identified poor ventilation and low-ceilinged enclosed spaces in the Pediatric Ward as a medium-level risk, with a high probability score (3) and a low severity score (1), resulting in an inherent risk rating of 3. Poorly ventilated healthcare environments may increase the risk of healthcare-associated infections (HAIs), airborne disease transmission, heat stress, and discomfort among patients, healthcare workers, and visitors, particularly among vulnerable pediatric populations. Adequate ventilation is a critical component of infection prevention and control because it reduces the concentration of airborne contaminants and infectious particles within healthcare settings. Evidence indicates that inadequate ventilation contributes to the transmission of airborne pathogens and may negatively affect patient safety and healthcare quality (World Health Organization, 2021; Centers for Disease Control and Prevention, 2022).

Proposed actions included evacuating patients and staff to designated relocation areas and reporting the issue to the Engineering and Facilities Management Department, Housekeeping Section, Nursing Division, physicians on duty, and Occupational and Patient Safety Committees for investigation and corrective action. Addressing environmental risks through proper ventilation systems, regular facility assessments, environmental monitoring, and infection prevention and control measures is essential for maintaining a safe healthcare environment and reducing the risk of healthcare-associated complications. Continuous evaluation of healthcare infrastructure and

ventilation performance can further strengthen patient safety and organizational preparedness for infectious disease threats (World Health Organization, 2021).

Table 15. Risk Register for the Risk on “Injury or acquisition of illness of patients, relatives, and staffs because of enclosed and low elevated space, with no enough ventilation for patients”

| RISK/ OPPORTUNITY EVENT                                                                                                                                 | Probability | Severity | Inherent Rating | Level  | Actions Plan                                                                                                                                                                                                                                                                                                               | Mitigation Plan                                                                                   | Target Date | Expected Outcome                                                                                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----------|-----------------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|-------------|----------------------------------------------------------------------------------------------------------------|
| Injury or acquisition of illness of patients, relatives, and staffs because of enclosed and low elevated space, with no enough ventilation for patients | 3           | 1        | 3               | Medium | 1. Evacuate patients and staff to identified relocation area.<br>2. Refer to the Engineering and Facilities Management Department, Housekeeping Section, and physician on duty.<br>3. Report to Occupational and Patient Safety Committees for investigation and resolution of risk.<br>4. Report to the Nursing Division. | 1. Request for an alternative area where the ward can relocate or the reconstruction of the area. | 2nd quarter | Relocation or reconstruction of the area.<br>No hospital acquired injuries for patients, relatives, and staff. |

### Risk 7: Length of stay of patient in the hospital is extended because of medication error related incidence

The study identified extended patient hospitalization due to medication error-related incidents as a low-level risk, with probability rated at 2 and severity rated at 1, resulting in an inherent risk rating of 2. Although the occurrence of medication errors in the Pediatric Ward was reported to be infrequent, medication-related incidents remain significant patient safety concerns in healthcare settings. The World Health Organization (2022) reported that medication errors are among the leading causes of avoidable harm in healthcare worldwide and contribute substantially to increased healthcare costs, prolonged hospitalization, and patient morbidity. Common medication errors include incorrect dosage, administration of the wrong medication, inappropriate treatment duration, omission of prescribed medications, and administration errors.

To address this risk, proposed actions included immediate patient assessment, prompt referral to physicians, implementation of necessary interventions, close patient monitoring, and reporting incidents to the Patient Safety Committee. Mitigation strategies also involved attendance at pharmacovigilance seminars and continuous monitoring of staff performance in medication preparation and administration. Evidence suggests that regular staff training, medication safety programs, medication reconciliation processes, standardized protocols, and continuous monitoring are effective measures for reducing medication errors and improving patient safety outcomes (World Health Organization, 2022; Rodziewicz et al., 2024).

Table 16. Risk Register for the Risk on “Length of stay of patient in the hospital is extended because of medication error related incidence”.

| RISK/ OPPORTUNITY EVENT                                                                              | Probability | Severity | Inherent Rating | Level | Actions Plan                                                                                                                                                                                                                                                                                        | Mitigation Plan                                                                                                                                            | Target Date | Expected Outcome                                                                           |
|------------------------------------------------------------------------------------------------------|-------------|----------|-----------------|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|--------------------------------------------------------------------------------------------|
| Length of stay of patient in the hospital is extended because of medication error related incidence. | 2           | 1        | 2               | Low   | 1. Assess the severity of impact to the patient.<br>2. Refer to the physician immediately after assessment.<br>3. Execute interventions to complications if needed. Prompt and close monitoring of patients if with no complications noted.<br>4. Prompt reporting to the Patient Safety Committee. | 1. Attending to pharmacovigilance seminars.<br>2. Periodic monitoring of the performance of staff especially in medication preparation and administration. | Daily       | No additional harm to patient.<br>Efficient preparation and administration of medications. |

## CONCLUSIONS

The study found that the Pediatric Ward of a hospital in Region II, Philippines has several strengths that contribute to the delivery of quality pediatric healthcare services. These include adequate staffing, staff willingness to learn, availability of medical equipment and supplies, established quality management systems, effective patient segmenting, and strong support from government programs and stakeholders. Opportunities such as professional trainings, technological advancements, healthcare initiatives, financial assistance programs, and possible infrastructure development also helped improve service delivery and overall organizational performance.

Despite these strengths, the study also identified several weaknesses and threats that may affect patient safety and healthcare delivery. These included limited pediatric emergency training, deficiencies in health records, punitive reporting culture, improper allocation of resources, equipment and supply limitations, poor ventilation, employee turnover, migration of healthcare workers, budget constraints, cyber threats, emerging diseases,

natural disasters, and legal risks. The Risk Register analysis further revealed important clinical and operational risks, such as needle stick injuries, medication errors, delayed patient care due to unavailable equipment and supplies, compromised staffing, poor ventilation, and documentation deficiencies.

Generally, the findings highlight the need for a comprehensive and proactive risk management framework to improve patient safety, healthcare quality, and operational efficiency. The study also emphasizes the importance of strengthening hospital policies, sustaining accreditation compliance, and improving healthcare system resilience, especially in resource-limited settings. Integrating SWOT, PESTLE, and Risk Register analyses may help healthcare institutions support evidence-based decision-making, improve preparedness, and respond more effectively to clinical, operational, and environmental challenges.

## REFERENCES

1. Agency for Healthcare Research and Quality. (2023). *Patient safety culture surveys and quality improvement resources*. U.S. Department of Health and Human Services.
2. Assiri, G. A., Shebl, N. A., Mahmoud, M. A., Aloudah, N., Grant, E., Aljadhey, H., & Sheikh, A. (2018). What is the epidemiology of medication errors, error-related adverse events and risk factors for errors in adults managed in community care contexts? A systematic review of the international literature. *BMJ Open*, 8(5), e019101. <https://doi.org/10.1136/bmjopen-2017-019101>
3. Bouya, S., Balouchi, A., Rafiemanesh, H., Amirshahi, M., Dastres, M., Moghadam, M. P., Behnamfar, N., Shyebak, M., Badakhsh, M., & Allahyari, J. (2020). Global prevalence and device-related causes of needle stick injuries among health care workers: A systematic review and meta-analysis. *Annals of Global Health*, 86(1), 35. <https://doi.org/10.5334/aogh.2698>
4. Centers for Disease Control and Prevention. (2022). *Sharps safety for healthcare settings*. U.S. Department of Health and Human Services.
5. Centers for Disease Control and Prevention. (2022). *Ventilation in buildings*. U.S. Department of Health and Human Services.
6. Centers for Disease Control and Prevention. (2022). *Public health emergency preparedness and response capabilities: National standards for state, local, tribal, and territorial public health*. U.S. Department of Health and Human Services.
7. Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). Sage Publications.
8. Department of Health. (2023). *National policy framework on patient safety*. Department of Health, Philippines.
9. Gürel, E., & Tat, M. (2017). SWOT analysis: A theoretical review. *Journal of International Social Research*, 10(51), 994–1006. <https://doi.org/10.17719/jisr.2017.1832>
10. Hayes, L. J., O'Brien-Pallas, L., Duffield, C., Shamian, J., Buchan, J., Hughes, F., Laschinger, H. K. S., North, N., & Stone, P. W. (2012). Nurse turnover: A literature review. *International Journal of Nursing Studies*, 49(7), 887–905. <https://doi.org/10.1016/j.ijnurstu.2011.10.001>
11. Hopkin, P. (2018). *Fundamentals of risk management: Understanding, evaluating and implementing effective risk management* (5th ed.). Kogan Page.
12. Institute of Medicine. (2007). *Preventing medication errors*. National Academies Press.
13. International Council of Nurses. (2022). *The global nursing workforce and the COVID-19 pandemic*. ICN.
14. International Organization for Standardization. (2018). *ISO 31000:2018 risk management—Guidelines*. ISO.
15. Jefferies, D., Johnson, M., & Griffiths, R. (2010). A meta-study of the essentials of quality nursing documentation. *International Journal of Nursing Practice*, 16(2), 112–124. <https://doi.org/10.1111/j.1440-172X.2009.01815.x>
16. Keers, R. N., Williams, S. D., Cooke, J., & Ashcroft, D. M. (2013). Causes of medication administration errors in hospitals: A systematic review. *Drug Safety*, 36(11), 1045–1067. <https://doi.org/10.1007/s40264-013-0090-2>
17. Kruk, M. E., Gage, A. D., Arsenault, C., Jordan, K., Leslie, H. H., Roder-DeWan, S., Adeyi, O., Barker, P., Daelmans, B., Doubova, S. V., English, M., García-Elorrio, E., Guanais, F., Gureje, O., Hirschhorn, L. R., Jiang, L., Kelley, E., Lemango, E. T., Liljestrand, J., ... Pate, M. (2018). High-quality health systems

- in the Sustainable Development Goals era: Time for a revolution. *The Lancet Global Health*, 6(11), e1196–e1252. [https://doi.org/10.1016/S2214-109X\(18\)30386-3](https://doi.org/10.1016/S2214-109X(18)30386-3)
18. Marufu, T. C., Collins, A., Vargas, L., Gillespie, L., & Almghairbi, D. (2021). Factors influencing retention among hospital nurses: A systematic review. *British Journal of Nursing*, 30(5), 302–308. <https://doi.org/10.12968/bjon.2021.30.5.302>
  19. McKone-Sweet, K. E., Hamilton, P., & Willis, S. B. (2005). The ailing healthcare supply chain: A prescription for change. *Journal of Supply Chain Management*, 41(1), 4–17. <https://doi.org/10.1111/j.1745-493X.2005.04101002.x>
  20. National Institute of Standards and Technology. (2024). *Cybersecurity framework (CSF) 2.0*. U.S. Department of Commerce.
  21. OECD. (2022). *Health at a glance: Europe 2022—State of health in the EU cycle*. OECD Publishing.
  22. Olsen, R. M., Hellzén, O., Skotnes, L. H., & Enmarker, I. (2014). Breakdowns in healthcare communication: An obstacle to patient safety. *Journal of Multidisciplinary Healthcare*, 7, 183–195. <https://doi.org/10.2147/JMDH.S61260>
  23. Occupational Safety and Health Administration. (2024). *Bloodborne pathogens and needlestick prevention*. U.S. Department of Labor.
  24. Perera, R. (2017). *The PESTLE analysis*. Nerdynaut Publishing.
  25. Perry, L., & Malkin, R. (2011). Effectiveness of medical equipment donations to improve health systems: How much medical equipment is broken in the developing world? *Medical & Biological Engineering & Computing*, 49(7), 719–722. <https://doi.org/10.1007/s11517-011-0786-3>
  26. Pronovost, P. J., Berenholtz, S. M., Goeschel, C. A., Needham, D. M., Sexton, J. B., Thompson, D. A., Lubomski, L. H., Marsteller, J. A., Makary, M. A., & Hunt, E. (2006). Creating high reliability in health care organizations. *Health Services Research*, 41(4 Pt 2), 1599–1617. <https://doi.org/10.1111/j.1475-6773.2006.00567.x>
  27. Republic Act No. 7610. (1992). *Special protection of children against abuse, exploitation and discrimination act*. Republic of the Philippines.
  28. Republic Act No. 9173. (2002). *Philippine Nursing Act of 2002*. Republic of the Philippines.
  29. Republic Act No. 9184. (2003). *Government Procurement Reform Act*. Republic of the Philippines.
  30. Republic Act No. 9439. (2007). *An Act prohibiting the detention of patients in hospitals and medical clinics on grounds of nonpayment of hospital bills or medical expenses*. Republic of the Philippines.
  31. Republic Act No. 11332. (2019). *Mandatory reporting of notifiable diseases and health events of public health concern act*. Republic of the Philippines.
  32. Rodziewicz, T. L., Houseman, B., & Hipskind, J. E. (2024). *Medical error reduction and prevention*. In *StatPearls*. StatPearls Publishing.
  33. UNICEF. (2023). *The state of the world's children 2023: For every child, vaccination*. UNICEF.
  34. World Bank. (2022). *World development report 2022: Finance for an equitable recovery*. World Bank.
  35. World Health Organization. (2009). *Natural ventilation for infection control in health-care settings*. WHO.
  36. World Health Organization. (2021). *Global patient safety action plan 2021–2030: Towards eliminating avoidable harm in health care*. WHO.
  37. World Health Organization. (2021). *Global strategy on digital health 2020–2025*. WHO.
  38. World Health Organization. (2021). *Roadmap to improve and ensure good indoor ventilation in the context of COVID-19*. WHO.
  39. World Health Organization. (2022). *Medication without harm: WHO global patient safety challenge*. WHO.
  40. World Health Organization. (2022). *Health worker safety charter*. WHO.
  41. World Health Organization. (2023). *Global report on health data systems and capacity*. WHO.
  42. World Health Organization. (2023). *Health workforce support and safeguards list 2023*. WHO.
  43. Yadav, P. (2015). Health product supply chains in developing countries: Diagnosis of the root causes of underperformance and an agenda for reform. *Health Systems & Reform*, 1(2), 142–154. <https://doi.org/10.1080/23288604.2015.1026626>

## Appendix A

### IDENTIFIED RISK AND RISK MATRIX

#### Compromised staffing because of increasing number of employee turnover

44.

|                                                                                                  |                                                                  |                                                                                 |                                                                                                                  |                                                                                                                 |
|--------------------------------------------------------------------------------------------------|------------------------------------------------------------------|---------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <b>Probability of Risk</b>                                                                       | <b>HIGH</b><br>more than 5 times chances of happening in a month | <b>MEDIUM (3)</b><br><br>1-2 staff resign from position                         | <b>HIGH (2)</b>                                                                                                  | <b>HIGH (3)</b><br><br>>2 staff resign from position                                                            |
|                                                                                                  | <b>MEDIUM</b><br>2-5 times chances of happening in a month       | <b>LOW (3)</b>                                                                  | <b>MEDIUM (2)</b>                                                                                                | <b>HIGH (1)</b>                                                                                                 |
|                                                                                                  | <b>LOW</b><br>0-1 times chance of happening in a month           | <b>LOW (1)</b><br><br>No staff resign from position                             | <b>LOW (2)</b>                                                                                                   | <b>MEDIUM (1)</b>                                                                                               |
| <b>IDENTIFIED RISK</b><br>Compromised staffing because of increasing number of employee turnover |                                                                  | <b>LOW</b><br>The area can effectively render care and service to all patients. | <b>MEDIUM</b><br>Pulling out of staff within the area to render care and service to all patients will be needed. | <b>HIGH</b><br>Pulling out of staff from other areas to render care and service to all patients will be needed. |
| <b>Severity of Consequence</b>                                                                   |                                                                  |                                                                                 |                                                                                                                  |                                                                                                                 |

1.

|                                |                                                                                                     |                                                                            |                                                                                                                              |                                                                                                                                 |
|--------------------------------|-----------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| <b>Probability of Risk</b>     | <b>HIGH</b><br>This risk happens more than 5 times in a month or 3-5 times in 2 consecutive months. | <b>MEDIUM (3)</b><br><br>46-50% of equipment are available and functioning | <b>HIGH (2)</b><br><br>36-40% of equipment are available and functioning                                                     | <b>HIGH (3)</b><br><br><35% of equipment are available and functioning                                                          |
|                                | <b>MEDIUM</b><br>This risk happens 3-5 times in a month or twice in 2 consecutives months.          | <b>LOW (3)</b><br><br>71-80% of equipment are available and functioning    | <b>MEDIUM (2)</b><br><br>51-60% of equipment are available and functioning                                                   | <b>HIGH (1)</b><br><br>41-45% of equipment are available and functioning                                                        |
|                                | <b>LOW</b><br>This risk happens 0-2 times in a month.                                               | <b>LOW (1)</b><br><br>91-100% of equipment are available and functioning   | <b>LOW (2)</b><br><br>81-90% of equipment are available and functioning                                                      | <b>MEDIUM (1)</b><br><br>61-70% of equipment are available and functioning                                                      |
|                                | <b>IDENTIFIED RISK</b><br>Care is delayed because of non-functioning and unavailable equipment.     | <b>LOW</b><br>Care is delivered on time, as needed.                        | <b>MEDIUM</b><br>Patients will wait for their turn to use equipment or the area needs to borrow from one of the other areas. | <b>HIGH</b><br>Patients will miss their procedure or the area needs to borrow from two or more areas to satisfy patients needs. |
| <b>Severity of Consequence</b> |                                                                                                     |                                                                            |                                                                                                                              |                                                                                                                                 |

## 2. Delayed patient care because of unavailability of medical supplies

|                                                                                               |                                                                                                     |                                                     |                                                            |                                                                                               |
|-----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|-----------------------------------------------------|------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| <b>Probability of Risk</b>                                                                    | <b>HIGH</b><br>This risk happens more than 5 times in a month or 3-5 times in 2 consecutive months. | <b>MEDIUM (3)</b><br>< 55 % of medical supplies     | <b>HIGH (2)</b><br>< 30 % of medical supplies              | <b>HIGH (3)</b><br>< 20 % of medical supplies                                                 |
|                                                                                               | <b>MEDIUM</b><br>This risk happens 3-5 times in a month or twice in 2 consecutive months.           | <b>LOW (3)</b><br>< 80 % of medical supplies        | <b>MEDIUM (2)</b><br>< 65 % of medical supplies            | <b>HIGH (1)</b><br>< 50 % of medical supplies                                                 |
|                                                                                               | <b>LOW</b><br>This risk happens 0-2 times in a month.                                               | <b>LOW (1)</b><br>90 - 100 % of medical supplies    | <b>LOW (2)</b><br>< 90 % of medical supplies               | <b>MEDIUM (1)</b><br>< 75 % of medical supplies                                               |
| <b>IDENTIFIED RISK</b><br>Delayed patient care because of unavailability of medical supplies. |                                                                                                     | <b>LOW</b><br>Care is delivered on time, as needed. | <b>MEDIUM</b><br>Care is delayed for 30 minutes to 1 hour. | <b>HIGH</b><br>Care is delayed more than an hour, where next activities/ care cannot proceed. |
| <b>Severity of Consequence</b>                                                                |                                                                                                     |                                                     |                                                            |                                                                                               |

## 3. Length of stay of patient in the hospital is extended because of medication error related incidence

|                                                                                                                                |                                                                                                  |                                                              |                                                                                             |                                                                                          |
|--------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| <b>Probability of Risk</b>                                                                                                     | <b>HIGH</b><br>This risk happens more than 3 times a month or 2-3 times in 2 consecutive months. | <b>MEDIUM (3)</b><br>8 to 9 - with no reaction to patients   | <b>HIGH (2)</b><br>12 to 13 - with no reaction to patients                                  | <b>HIGH (3)</b><br>> 13 - with no reactions to patients; 1 - with reaction to patient    |
|                                                                                                                                | <b>MEDIUM</b><br>This risk happens 2-3 times in 6 months.                                        | <b>LOW (3)</b><br>2 to 3 - with no reaction to patients      | <b>MEDIUM (2)</b><br>6 to 7 - with no reaction to patients                                  | <b>HIGH (1)</b><br>10 to 11 - with no reaction to patients                               |
|                                                                                                                                | <b>LOW</b><br>This risk happens 0-1 times in 3 months.                                           | <b>LOW (1)</b><br>0                                          | <b>LOW (2)</b><br>1 - with no reaction to patient                                           | <b>MEDIUM (1)</b><br>4 to 5 - with no reaction to patient                                |
| <b>IDENTIFIED RISK</b><br>Length of stay of patient in the hospital is extended because of medication error related incidence. |                                                                                                  | <b>LOW</b><br>No physical reactions is observed in patients. | <b>MEDIUM</b><br>No physical reactions in patients but needs increase supervision on staff. | <b>HIGH</b><br>With physical reaction to patients that needs additional care/ treatment. |
| <b>Severity of Consequence</b>                                                                                                 |                                                                                                  |                                                              |                                                                                             |                                                                                          |

## 4. Needle stick injury because of non-compliance of staff with the procedure standard

|                                                                                                               |                                                                                                           |                                                                                   |                                                                           |                                                                                                               |
|---------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| <b>Probability of Risk</b>                                                                                    | <b>HIGH</b><br>The risk happens more than 3 times in a quarter, or 2-3 times in two consecutive quarters. | <b>MEDIUM (3)</b>                                                                 | <b>HIGH (2)</b>                                                           | <b>HIGH (3)</b><br>More than 3 incidence of injury with no infections acquired, or 1 with infections acquired |
|                                                                                                               | <b>MEDIUM</b><br>This risk happens 2-3 times in a quarter.                                                | <b>LOW (3)</b>                                                                    | <b>MEDIUM (2)</b><br>2-3 incidence of injury with no infections acquired  | <b>HIGH (1)</b>                                                                                               |
|                                                                                                               | <b>LOW</b><br>This risk happens once in a quarter.                                                        | <b>LOW (1)</b><br>0-1 incidence of injury with no infections acquired             | <b>LOW (2)</b>                                                            | <b>MEDIUM (1)</b>                                                                                             |
| <b>IDENTIFIED RISK</b><br>Needle stick injury because of non-compliance of staff with the procedure standard. |                                                                                                           | <b>LOW</b><br>Staff can immediately perform patient care with minimal discomfort. | <b>MEDIUM</b><br>Medical workup is needed before performing patient care. | <b>HIGH</b><br>Medical treatment is needed and absence from work may be possible.                             |
| <b>Severity of Consequence</b>                                                                                |                                                                                                           |                                                                                   |                                                                           |                                                                                                               |

## 5. Inefficient patient care because of health record deficiencies

|                         |                                                                                             |                                                                                                 |                                                                                           |                                                                                            |
|-------------------------|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| Probability of Risk     | <b>HIGH</b><br>The risk happens more than 5 times a month.                                  | <b>MEDIUM (3)</b><br>7 deficiencies noted                                                       | <b>HIGH (2)</b><br>9 deficiencies noted                                                   | <b>HIGH (3)</b><br>> 9 deficiencies noted                                                  |
|                         | <b>MEDIUM</b><br>This risk happens 4-5 times a month or 1-3 times in two consecutive month. | <b>LOW (3)</b><br>3-4 deficiencies noted                                                        | <b>MEDIUM (2)</b><br>6 deficiencies noted                                                 | <b>HIGH (1)</b><br>8 deficiencies noted                                                    |
|                         | <b>LOW</b><br>The risk happens 1-3 times a month.                                           | <b>LOW (1)</b><br>No deficiencies noted                                                         | <b>LOW (2)</b><br>1-2 deficiencies noted                                                  | <b>MEDIUM (1)</b><br>5 deficiencies noted                                                  |
|                         | <b>IDENTIFIED RISK</b><br>Inefficient patient care because of Health Record deficiencies.   | <b>LOW</b><br>The deficiencies can be corrected within 24 hours and do not affect the course of | <b>MEDIUM</b><br>The deficiencies affect the course treatment but can still be corrected. | <b>HIGH</b><br>The deficiencies affect the whole treatment course and needs to be revised. |
| Severity of Consequence |                                                                                             |                                                                                                 |                                                                                           |                                                                                            |

- 48.
6. Injury or acquisition of illness of patients, relatives, and staffs because of enclosed and low elevated space, with no enough ventilation for patients

|                         |                                                                                                                                                                                   |                                                                             |                                                                           |                                                                |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|---------------------------------------------------------------------------|----------------------------------------------------------------|
| Probability of Risk     | <b>HIGH</b><br>The risk happens more than 3 times in a semester.                                                                                                                  | <b>MEDIUM (3)</b>                                                           | <b>HIGH (2)</b>                                                           | <b>HIGH (3)</b><br>More than 3 incidence of injury             |
|                         | <b>MEDIUM</b><br>This risk happens 2-3 times in a semester.                                                                                                                       | <b>LOW (3)</b>                                                              | <b>MEDIUM (2)</b><br>2-3 incidence of injury                              | <b>HIGH (1)</b>                                                |
|                         | <b>LOW</b><br>This risk happens once in a semester.                                                                                                                               | <b>LOW (1)</b><br>0-1 incidence of injury                                   | <b>LOW (2)</b>                                                            | <b>MEDIUM (1)</b>                                              |
|                         | <b>IDENTIFIED RISK</b><br>Injury or acquisition of illness of patients, relatives, and staffs because of enclosed and low elevated space, with no enough ventilation for patients | <b>LOW</b><br>Injury or illness can be alleviated or cured within 24 hours. | <b>MEDIUM</b><br>Injury or illness needs to be addressed within 72 hours. | <b>HIGH</b><br>Medical treatment is needed more than 72 hours. |
| Severity of Consequence |                                                                                                                                                                                   |                                                                             |                                                                           |                                                                |

49.