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Guidelines for Efficient Patient Triage in a Cruise Ship Medical
Infirmary: A Decision Tree Approach

This article presents a decision tree model tailored for the unique healthcare environment on cruise ships, aiming to streamline patient triage in a ship's medical infirmary. The model supports decision-making for phone operators, assisting them to differentiate between administrative and medical concerns, and further to classify these medical concerns based on the patient's status as an adult, paediatric, or elderly patient.

One key feature of the model is its ability to determine the most appropriate mode of consultation – whether it be a teleconsultation, or a face-to-face consultation with the onboard ship's doctor. This decision is guided by an assessment of the urgency and nature of the health issue at hand.

By implementing this decision tree, cruise ships can enhance their medical service delivery, ensuring both crew and guests receive timely and appropriate medical care according to their specific needs. This adaptable model can be tailored to fit specific healthcare settings and is aligned with local guidelines and recommendations. It could significantly reduce the load on medical teams, decrease patient wait times, and increase patient satisfaction, with an improvement in ILO violations.

The following proposal is for a trial implementation of a nurse-led telephone triage system within our onboard healthcare services. This model aims to optimize the delivery of care, streamline healthcare processes, and ensure that patients receive timely and appropriate medical attention without compromising on the quality of care.

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This is inspired by the successful implementation of similar models in other healthcare systems, notably the National Health Service (NHS) in the UK. Studies from the NHS have shown that teleconsultations can be just as effective as face-to-face consultations for certain conditions, and they can be conducted more efficiently, with a 2016 study by Brant et al. reporting that teleconsultations were on average **10.6** minutes shorter than face-to-face consultations.

1. **Efficiency:** Given the constraints of onboard medical facilities, telephone triage can help ensure that resources are used where they are most needed. A nurse-led triage system would effectively sort and direct patients, ensuring that those who require immediate face-to-face attention receive it, while others can be helped effectively via telephone consultation.

2. **Patient Wait Times:** By efficiently managing medical queries, wait times can be reduced for crew and guests. Instead of waiting for a face-to-face appointment, they can receive medical advice and treatment recommendations more promptly via telephone consultations.

3. **Staff Workload:** Implementing a telephone triage system could significantly reduce the workload of medical teams, helping them focus on more serious cases that require in-person attention and reducing the risk of overwork and potential ILO MLC violations.

4. **Guest Satisfaction:** The convenience and immediacy of telephone consultations can lead to increased patient satisfaction. The NHS, has reported high satisfaction rates with their teleconsultation services.

The proposed system would cover a range of health conditions suitable for teleconsultation, including uncomplicated urinary tract infections, small-scale skin conditions, digestive issues, stable chronic conditions, and certain women's and men's health issues.

However, it is crucial to highlight that each case will be individually assessed by our nursing team and **the final decision regarding the mode of consultation will always rest with physicians**. They will have the discretion to change a teleconsultation to a face-to-face consultation based on their professional judgment.

We have prepared a comprehensive list of red-flag symptoms that would necessitate a face-to-face consultation or immediate medical care. This list will serve as a guide for telephone triage nurses in ensuring that no serious conditions are overlooked.



A compilation of health conditions that could potentially be suitable for teleconsultations, although it must be emphasised that each case requires individual consideration based on the patient's unique circumstances and medical history:

1. Uncomplicated urinary tract infections (UTIs).
2. Small-scale skin conditions: Including rashes, eczema, acne, minor insect bites, or dermatitis.
3. Digestive issues: Such as acid reflux (GERD), or constipation.
4. Stable chronic conditions: Including diabetes, hypertension, or asthma.
5. Women's health: Including menstrual issues, premenstrual syndrome (PMS), or contraceptive counselling.
6. Men's health: Such as erectile dysfunction, premature ejaculation, or low testosterone.
7. Lifestyle management: Like weight management, smoking cessation, or nutritional counselling.
8. Headaches: Specifically tension headaches or mild migraines.
9. Allergic reactions: Minor allergies or hay fever.
10. Eye conditions: Conjunctivitis or dry eye syndrome.
11. Musculoskeletal issues: Minor sprains, strains (when no red flags are present).

Diagnoses and symptoms for musculoskeletal complaints suitable for teleconsultations:

1. Mild to moderate sprains and strains: Minor injuries to muscles, ligaments, or tendons that do not significantly impact mobility or function.
2. Tendonitis: Inflammation or irritation of a tendon (e.g., tennis elbow, golfer's elbow, or rotator cuff tendonitis) without significant functional impairment.



3. Repetitive stress injuries: Conditions such as carpal tunnel syndrome or trigger finger, with mild to moderate symptoms.

Red flags for musculoskeletal complaints that necessitate face-to-face consultations:

1. Severe pain or swelling: Intense pain or significant swelling that does not improve with rest, ice, compression, and elevation (RICE) therapy.
2. Major trauma or injury: Suspected fractures, dislocations, or significant ligament injuries that may require immediate medical attention.
3. Neurological symptoms: Numbness, tingling, weakness, or loss of function in the extremities, which may indicate nerve compression or damage.
4. Signs of infection: Redness, warmth, fever, or discharge around a joint or wound, which may indicate an infection that requires urgent treatment.
5. Systemic symptoms: Unexplained weight loss, fever, or severe fatigue accompanying musculoskeletal pain, which could suggest an underlying systemic condition.
6. Progressive or severe functional limitations: Inability to bear weight, move a joint, or perform daily activities due to pain or musculoskeletal issues.
7. Persistent symptoms: Musculoskeletal pain or discomfort that does not improve after conservative treatment and self-care measures.

For any caller, the presence of one or more red-flag symptoms necessitates a face-to-face consultation or immediate medical care. These symptoms include, but are not limited to:

1. Chest pain or discomfort: Can be a sign of a heart attack or other serious cardiac conditions.



2. Difficulty breathing or shortness of breath: May indicate respiratory distress, heart failure, or a severe allergic reaction.
3. Severe abdominal pain: Can signal appendicitis, gallbladder issues, or other acute abdominal conditions.
4. Sudden, severe headache: May be a sign of a stroke, brain aneurysm, or meningitis.
5. Altered mental status or confusion: Can be caused by a stroke, head injury, infection, or other serious neurological conditions.
6. Loss of consciousness or fainting: May be due to heart problems, low blood pressure, dehydration, or other causes that require immediate evaluation.
7. Seizures: New-onset seizures, recurrent seizures, or a prolonged seizure (longer than 5 minutes) may warrant urgent medical attention.
8. Severe bleeding or major trauma: Injuries such as deep lacerations, fractures, or head injuries require prompt care.
9. Signs of meningitis: Severe headache, neck stiffness, high fever, and rash may indicate meningitis, which requires urgent evaluation and treatment.
10. Severe or worsening reaction to an insect bite or sting: This may indicate anaphylaxis, a severe allergic reaction that requires immediate medical attention.
11. Severe or persistent vomiting or diarrhoea: Can lead to dehydration and electrolyte imbalances that need prompt evaluation and treatment.
12. Sudden vision loss or double vision: May be a sign of a stroke, retinal detachment, or other serious eye conditions.
13. Slurred speech, facial drooping, or sudden weakness on one side of the body: These are possible signs of a stroke, which requires immediate medical attention.



Red-flag symptoms in paediatrics and elderly medicine may differ from those in the general adult population. It is important to recognise these symptoms in order to determine the need for a face-to-face consult or immediate medical care.

Paediatrics:

1. High fever: A fever of 38°C or higher in infants under 3 months old, or a persistent high fever in older children.
2. Lethargy or unresponsiveness: An unusually sleepy, difficult to wake, or unresponsive child may require immediate medical attention.
3. Rapid or laboured breathing: This could be a sign of respiratory distress or infection in infants and young children.
4. Dehydration: Signs include sunken eyes, dry mouth, few or no tears when crying, and decreased urination.
5. Non-blanching rash: Small, red or purple spots that don't disappear when pressure is applied can indicate meningitis or another serious infection.
6. Refusal to eat or drink: Persistent refusal to eat or drink in infants or young children may require medical evaluation.
7. Seizures or convulsions: New-onset seizures or recurrent seizures in children warrant urgent medical attention.
8. Bulging fontanelle: A bulging or tense soft spot on an infant's head can be a sign of increased intracranial pressure, which requires immediate evaluation.

Elderly Medicine:

1. Falls or injuries: Elderly patients are at higher risk for fractures and other serious injuries following a fall, which may require urgent care.
2. Sudden confusion or delirium: Acute changes in mental status can be a sign of infection, medication side effects, or other serious conditions in elderly patients.



3. Difficulty breathing or shortness of breath: May indicate heart failure, pneumonia, or other serious respiratory conditions more common in the elderly population.
4. Swelling in the legs or feet: Can be a sign of heart failure, kidney problems, or deep vein thrombosis.
5. Severe or persistent pain: Uncontrolled pain in elderly patients may require further evaluation and management.
6. Pressure sores or non-healing wounds: These can be a sign of underlying infection, poor circulation, or other issues that require medical attention.
7. Signs of malnutrition or dehydration: Poor appetite, weight loss, or signs of dehydration may indicate the need for medical intervention.

Decision-Tree to use as a guide for filtering paediatric, adult, and elderly patients into appropriate categories: administrative tasks, teleconsults, face-to-face consults, or immediate medical care.

- 1) Is the patient's concern primarily administrative? (e.g., appointment scheduling, billing, prescription refills, or test results)
 - └ Yes: Direct the patient to the appropriate personnel for assistance.
 - └ No: Proceed to question 2.
- 2) Does the patient understand the nature and limitations of telemedicine?
 - └ Yes: Proceed to question 3.
 - └ No: Provide necessary information and obtain informed consent before proceeding.



3) Determine the patient's age group:

└─ Paediatric: Proceed to question 4.

└─ Adult: Proceed to question 5.

└─ Elderly: Proceed to question 6.

4) Does the paediatric patient have any red-flag symptoms? (e.g., high fever, lethargy, rapid breathing, dehydration, non-blanching rash, refusal to eat/drink, seizures, or bulging fontanelle)

└─ Yes: Advise immediate medical attention.

└─ No: Proceed to question 7.

5) Does the adult patient have any red-flag symptoms? (e.g., chest pain, difficulty breathing, severe abdominal pain, sudden headache, altered mental status, loss of consciousness, seizures, severe bleeding, signs of meningitis, severe allergic reaction, severe vomiting/diarrhoea, sudden vision loss, or signs of a stroke)

└─ Yes: Advise immediate medical attention.

└─ No: Proceed to question 7.

6) Does the elderly patient have any red-flag symptoms? (e.g., falls/injuries, sudden confusion, difficulty breathing, swelling in legs/feet, severe pain, pressure sores, or signs of malnutrition/dehydration)

└─ Yes: Advise immediate medical attention.

└─ No: Proceed to question 7.

7) Can the patient's medical issue likely be addressed without a physical examination or diagnostic tests? (e.g., medication



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management, mild illness, , follow-up, post-shoreside referral
discussion)

└ Yes: Proceed to question 8.

└ No: Schedule a face-to-face consult, ensuring the patient
understands why this is necessary.

8) Is the comfortable with a teleconsult?

└ Yes: Schedule a teleconsult, ensuring that the patient's data will
be securely handled and privacy will be maintained.

└ No: Schedule a face-to-face consult, explaining the reasons
clearly to the patient.



To ensure the successful implementation of a nurse-led triage system as a pilot program, we propose the following measures:

- 1) Limit the daily teleconsultation load to a maximum of 10 cases, ensuring manageable caseloads and quality patient care.
- 2) Implement stringent quality assurance and audit protocols: These procedures will validate adherence to required care standards and enable early identification and rectification of potential issues, thereby mitigating the risk of legal claims.
- 3) Conduct patient satisfaction surveys: Regular feedback from patients will allow us to gauge the effectiveness of the system and make improvements where necessary.
- 4) Investigate and address any patient complaints: By promptly addressing grievances, we can continually enhance the quality of our teleconsultation service.
- 5) Track the number of consultations transitioned from teleconsultation to face-to-face: This metric will provide insight into the effectiveness of our triage system and help us refine our screening process.
- 6) Monitor and report any adverse events: A robust reporting system will allow us to promptly identify and implement necessary changes to maintain patient safety and service quality.



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