

Appendix I: Survey Tools

Round 1 Survey Tool

SAFECARR eDelphi Survey: Please complete by 6/15/19

Thank you for agreeing to contribute to this eDelphi survey for the SAFECARR Project. Your answers will be completely confidential. The data gathered within this survey will be used to further multi-center trials aimed at reduction in AVOIDABLE events. In addition, we seek to better define cardiac arrest events to allow for recommendations on which events would most benefit from formal debriefing. Prior to answering these questions, be sure to watch the video introducing the project below. The video introduces the project, its aims and scope, and the final goals for implementation. In this round, DEFINITION CONSENSUS, you will be asked to rate your agreement with the definitions for AVOIDABLE, POTENTIALLY AVOIDABLE, and UNAVOIDABLE cardiac arrest WITHIN the PICU. This round will be open for 4 weeks and should require less than 30 minutes to complete.

If you have not completed Part 1. Please review the video prior to starting this survey.

Have you watched the SAFECARR eDelphi Intro Video?

- Yes
 No

Part 2: Definition Consensus Survey

Are you a...

- Physician (MD/DO) or physician researcher
 Nurse, nurse administrator, or APRN
 Non-physician researcher
 Other (please specify)
 Prefer not to answer

Other _____

What is your specialty?

- PICU only
 CICU only
 Pediatric Hospital Medicine
 Pediatric Emergency Medicine
 Adult Hospital Medicine
 Adult Emergency Medicine
 Anesthesia
 Other (please specify)
 Prefer not to answer

Other _____

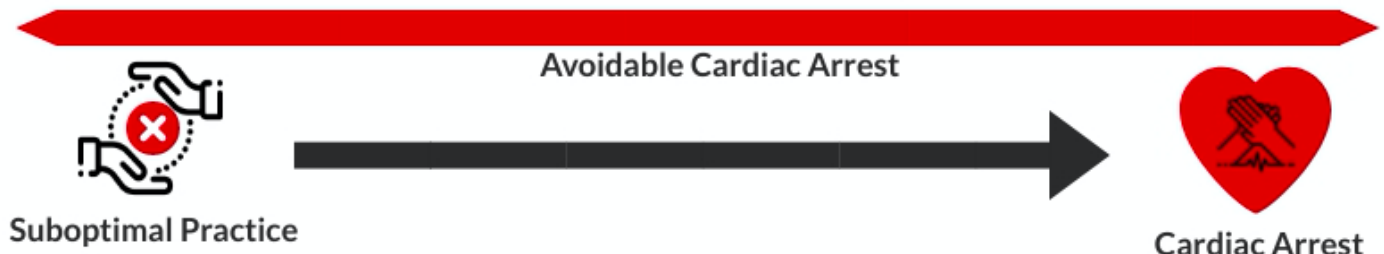
Please list your years of clinical experience
(following completion of your training)

Consensus on Definitions

We are seeking consensus on the definitions of AVOIDABLE, POTENTIALLY AVOIDABLE, and UNAVOIDABLE cardiac arrest WITHIN THE PICU only.

Avoidable Cardiac Arrest

Avoidable cardiac arrest occurs when patients receive suboptimal care that DIRECTLY leads to the cardiac arrest event.



Definition: Avoidable cardiac arrest events include variations from expected practice within the PICU leading to a cardiac arrest. These events would meet the definition of serious safety event. A serious safety event is defined as "a deviation from generally accepted performance standards that reaches the patient and results in moderate to severe harm or death".

Example: Incorrect dosing of potassium leading to arrhythmia and cardiac arrest requiring CPR.

Do you agree with the definition of AVOIDABLE Cardiac Arrest within the PICU?

- Strongly Agree Agree
 Neither disagree nor agree
 Disagree Strongly Disagree
 Prefer not to answer

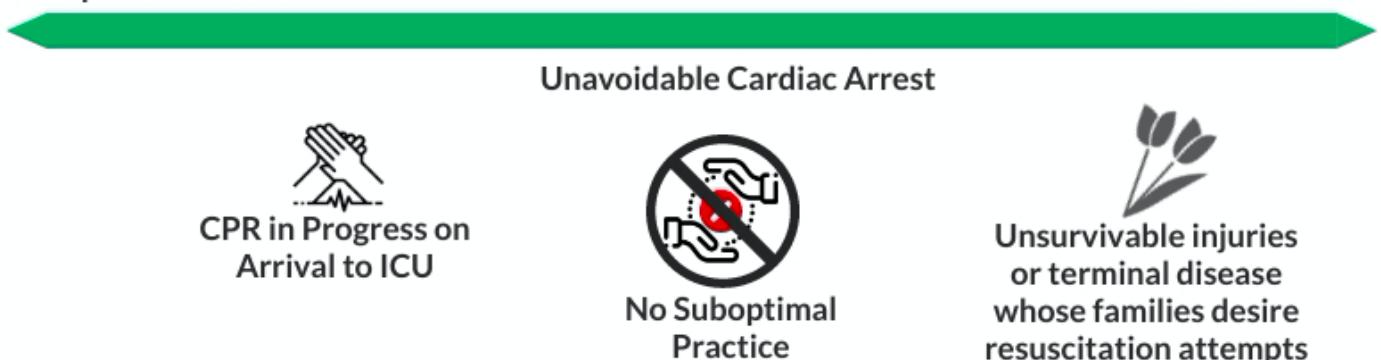
Any additional comments:

Unavoidable Cardiac Arrest

Unavoidable cardiac arrest occurs in three possible circumstances. We will assess each individually. Remember that we are only discussing events in relation to the pediatric ICU (not code response team or rapid response team).

Suboptimal Practice

Cardiac Arrest



Definition: Unavoidable cardiac arrests are events that the PICU TEAM cannot prevent or avoid

First Scenario for Unavoidable Cardiac Arrest: CPR in Progress on Arrival to PICU

Example: A patient experiences a cardiac arrest on the general ward and arrives to the PICU with CPR in progress and a rhythm of PEA.



**CPR in Progress on
Arrival to ICU**

Do you agree that if a patient arrives to the PICU with CPR in progress it is an UNAVOIDABLE Cardiac Arrest (i.e. a cardiac arrest that the PICU Team cannot prevent or avoid)?

- Strongly Agree Agree
 Neither disagree nor agree
 Disagree Strongly Disagree
 Prefer not to answer

Second Scenario for Unavoidable Cardiac Arrest: Non-survivable injury or immediately terminal disease that progresses to arrest

Example: A patient with a large non-resectable brain tumor that is unresponsive to chemotherapy and radiation progress to coma with severe bradycardia and then cardiac arrest. Despite the oncology teams guidance that this is a terminal diagnosis, the family insists on resuscitative efforts.



**Unsurvivable injuries
or terminal disease
whose families desire
resuscitation attempts**

Do you agree that if a patient with an immediately terminal disease or non survivable injuries who has received optimal care in the PICU has a cardiac arrest that it is UNAVOIDABLE (i.e. a cardiac arrest that the PICU Team cannot prevent or avoid)?

- Strongly Agree Agree
 Neither disagree nor agree
 Disagree Strongly Disagree
 Prefer not to answer

Third Scenario for Unavoidable Cardiac Arrest: Patient receives optimal care and yet progresses to cardiac arrest despite the team's heroic efforts.

Example: A patient presents with purpura fulminans and blood culture positive for meningococemia. Despite timely antibiotics and compliance with all sepsis guidelines, the patient progresses to refractory shock. The team offers the family VA ECMO which they decline. The patient progresses to PEA and parents request CPR while awaiting arrival of siblings to the bedside.



**No Suboptimal
Practice**

Do you agree that when a patient receives optimal care but still progresses to cardiac arrest, that the cardiac arrest is UNAVOIDABLE (i.e. a cardiac arrest that the PICU Team cannot prevent or avoid)?

- Strongly Agree
- Agree
- Neither disagree nor agree
- Disagree
- Strongly Disagree
- Prefer not to answer

Please add any additional comments or possible scenarios where a cardiac arrest may be considered UNAVOIDABLE (i.e. a cardiac arrest that the PICU Team cannot prevent or avoid).

Potentially Avoidable Cardiac Arrest

Potentially avoidable cardiac arrest is an event in which a patient receives suboptimal practice and that practice may or may not have led to the cardiac arrest.



Definition: Potentially avoidable cardiac arrests occur when a patient experiences care WITHIN THE PICU that is determined to be suboptimal and that patient later experiences a cardiac arrest that MAY OR MAY NOT be related to the suboptimal care.

Example: A patient with a central line develops a fever while in the PICU. Antibiotics are delayed more than 6 hours from the time of fever. The patient progresses to refractory shock 24 hours later and has a cardiac arrest 72 hours following the fever.

Do you agree with the definition of POTENTIALLY AVOIDABLE Cardiac Arrest within the PICU?

- Strongly Agree
- Agree
- Neither disagree nor agree
- Disagree
- Strongly Disagree
- Prefer not to answer

Any Additional Comments?

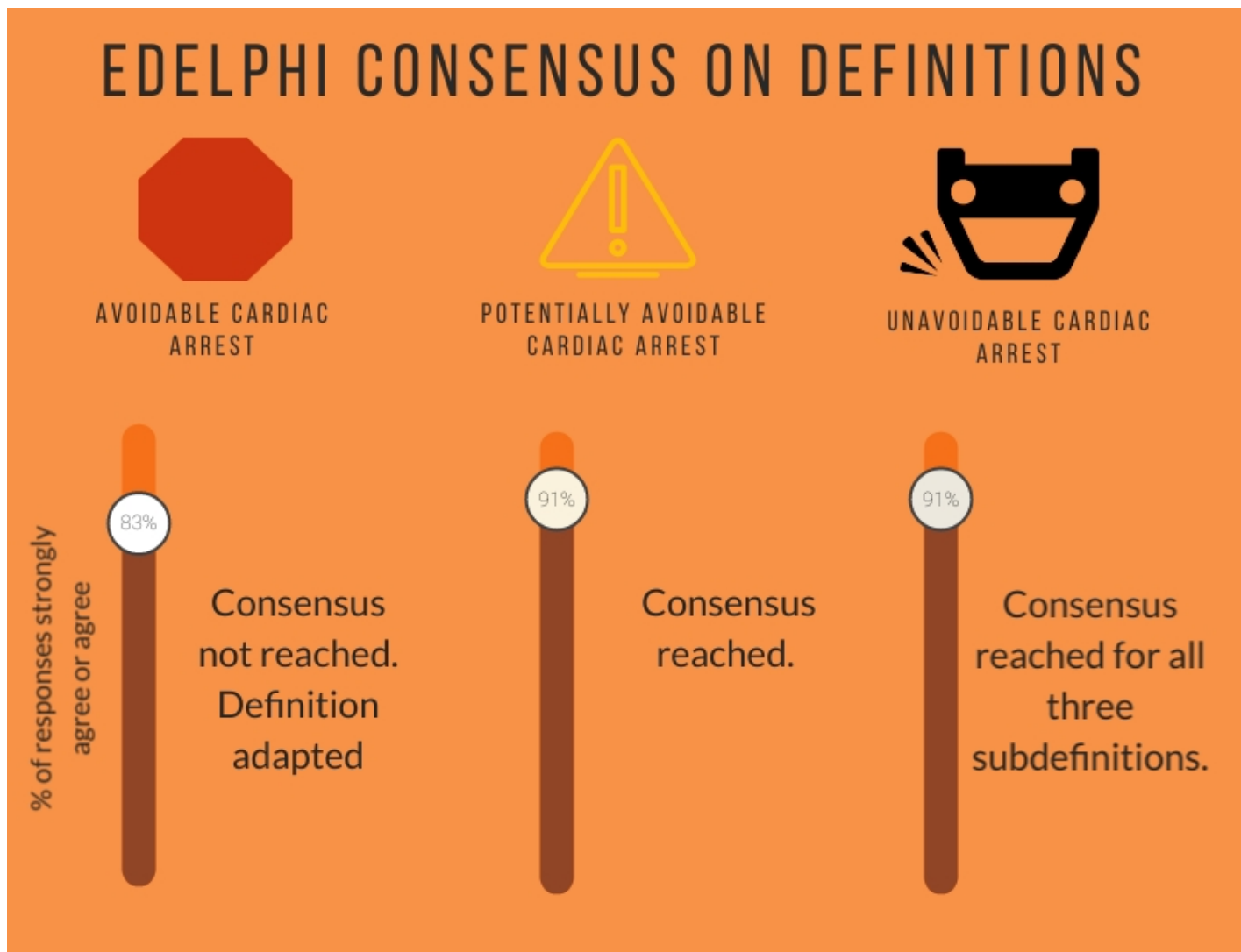
Factors That Contribute To Potentially Avoidable Cardiac Arrest

Contributing factors will be assessed for consensus and feasibility in the next round of the eDelphi. Please note any factors that you think may contribute to potentially avoidable cardiac arrest in this section in preparation for the next round.

Initial List of Proposed Contributing Factors Based on Literature Search

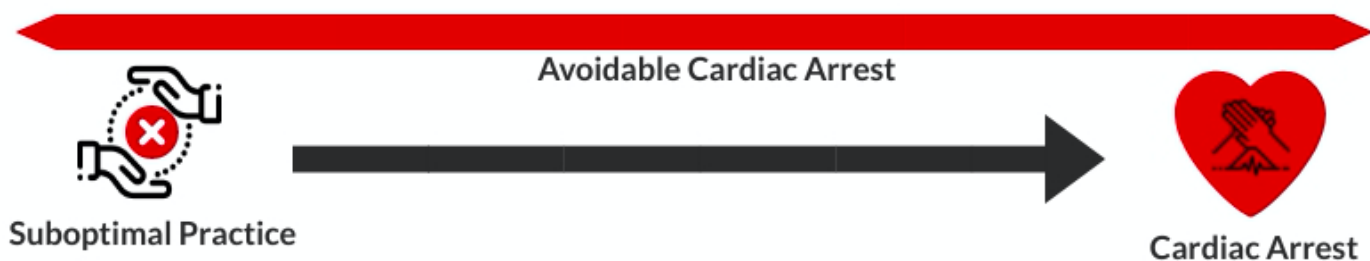
- Lack of or inappropriate patient monitoring or surveillance
- Delay or error in diagnosis
- Delay by bedside front-line provider to inform responding MD/Advanced practitioner of patient condition
- Inadequate response to abnormal labs
- Delay by MD/Advanced practitioner to respond
- Inadequate treatment of clinical condition
- Failure or Timeliness to respond to abnormal labs or to adequately interpret radiology tests
- Procedural or surgical complication

Please list any additional factors that you think may contribute to POTENTIALLY AVOIDABLE cardiac arrest. We will seek consensus on these factors and their feasibility in the next round.



Before Starting the Review of Factors that Lead to POTENTIALLY AVOIDABLE Cardiac Arrest, we will again seek consensus on an adapted definition of AVOIDABLE CARDIAC ARREST

Avoidable cardiac arrest occurs when patients receive suboptimal care that DIRECTLY leads to the cardiac arrest event.



Definition: Avoidable cardiac arrest events are events in which deviations from accepted practice standards within the PICU lead directly to cardiac arrest.

Example #1: Incorrect dosing of potassium leading to arrhythmia and cardiac arrest requiring CPR.

Example #2: A ventilator disconnect alarm within a patient's room sounds for 5 minutes without response by the medical team. The patient develops hypoxemia then bradycardia followed by cardiac arrest.

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- 1) Do you agree with the definition of AVOIDABLE Cardiac Arrest within the PICU?
- Strongly Agree
 - Agree
 - Neither disagree nor agree
 - Disagree
 - Strongly Disagree
 - Prefer not to answer
-

2) Any additional comments:

Round 3: Contributing Factors

This round will focus on achieving consensus on factors that may lead to POTENTIALLY AVOIDABLE cardiac arrest. Each factor will be assessed for importance and feasibility.

Factor #1: Lack of or inappropriate patient monitoring or surveillance

- 3) Do you agree that the lack of or inappropriate patient monitoring or surveillance is an important contributor to POTENTIALLY AVOIDABLE cardiac arrests?
- Strongly Agree
 - Agree
 - Neither disagree nor agree
 - Disagree
 - Strongly Disagree
 - Prefer not to answer
-

- 4) Do you agree that it is feasible to assess whether the lack of or inappropriate patient monitoring or surveillance contributed to a POTENTIALLY AVOIDABLE cardiac arrest?
- Strongly Agree
 - Agree
 - Neither disagree nor agree
 - Disagree
 - Strongly Disagree
 - Prefer not to answer
-

5) Any additional comments:

Factor #2: Delay or error in diagnosis

- 6) Do you agree that a delay or error in diagnosis is an important contributor to POTENTIALLY AVOIDABLE cardiac arrests?
- Strongly Agree
 - Agree
 - Neither disagree nor agree
 - Disagree
 - Strongly Disagree
 - Prefer not to answer
-

- 7) Do you agree that it is feasible to assess whether a delay or error in diagnosis contributed to a POTENTIALLY AVOIDABLE cardiac arrest?
- Strongly Agree
 - Agree
 - Neither disagree nor agree
 - Disagree
 - Strongly Disagree
 - Prefer not to answer
-

8) Any additional comments:

Factor #3: Delay by bedside front-line providers (nurse or respiratory therapist) to inform responding physician/advanced practitioner of patient condition.

9) Do you agree that a delay by bedside front-line providers (nurse or respiratory therapist) to inform responding physician/advanced practitioner of patient condition is an important contributor to POTENTIALLY AVOIDABLE cardiac arrests?

Strongly Agree
 Agree
 Neither disagree nor agree
 Disagree
 Strongly Disagree
 Prefer not to answer

10) Do you agree that it is feasible to assess whether a delay by bedside front-line providers (nurse or respiratory therapist) to inform responding physician/advanced practitioner of patient condition contributed to a POTENTIALLY AVOIDABLE cardiac arrest?

Strongly Agree
 Agree
 Neither disagree nor agree
 Disagree
 Strongly Disagree
 Prefer not to answer

11) Any additional comments:

Factor #4: Delay by physician/advanced practitioner to respond to changes in patient condition

12) Do you agree that a delay by physician/advanced practitioner to respond to changes in patient condition is an important contributor to POTENTIALLY AVOIDABLE cardiac arrests?

Strongly Agree
 Agree
 Neither disagree nor agree
 Disagree
 Strongly Disagree
 Prefer not to answer

13) Do you agree that it is feasible to assess whether a delay by physician/advanced practitioner to respond to changes in patient condition contributed to a POTENTIALLY AVOIDABLE cardiac arrest?

Strongly Agree
 Agree
 Neither disagree nor agree
 Disagree
 Strongly Disagree
 Prefer not to answer

14) Any additional comments:

Factor #5: Inadequate treatment of clinical condition

15) Do you agree that inadequate treatment of a clinical condition is an important contributor to POTENTIALLY AVOIDABLE cardiac arrests?

Strongly Agree
 Agree
 Neither disagree nor agree
 Disagree
 Strongly Disagree
 Prefer not to answer

16) Do you agree that it is feasible to assess whether inadequate treatment of a clinical condition contributed to a POTENTIALLY AVOIDABLE cardiac arrest?

Strongly Agree
 Agree
 Neither disagree nor agree
 Disagree
 Strongly Disagree
 Prefer not to answer

17) Any additional comments:

Factor #6: Failure to respond or prolonged time to respond to abnormal labs or to adequately interpret radiology tests

18) Do you agree that failure to respond, or prolonged time to respond to abnormal labs, or to adequately interpret radiology tests is an important contributor to POTENTIALLY AVOIDABLE cardiac arrests?

Strongly Agree
 Agree
 Neither disagree nor agree
 Disagree
 Strongly Disagree
 Prefer not to answer

19) Do you agree that it is feasible to assess whether failure to respond or prolonged time to respond to abnormal labs contributed to a POTENTIALLY AVOIDABLE cardiac arrest?

Strongly Agree
 Agree
 Neither disagree nor agree
 Disagree
 Strongly Disagree
 Prefer not to answer

20) Any additional comments:

Factor #7: Procedural or surgical complication while admitted to the PICU

21) Do you agree that a procedural or surgical complication is an important contributor to POTENTIALLY AVOIDABLE cardiac arrests?

Strongly Agree
 Agree
 Neither disagree nor agree
 Disagree
 Strongly Disagree
 Prefer not to answer

22) Do you agree that it is feasible to assess whether a surgical or procedural complication contributed to a POTENTIALLY AVOIDABLE cardiac arrest?

Strongly Agree
 Agree
 Neither disagree nor agree
 Disagree
 Strongly Disagree
 Prefer not to answer

23) Any additional comments:

Factor #8 Failure to transfer patient to an appropriate facility (i.e. failure to transfer a patient with severe ARDS to ECMO center prior to cardiac arrest from profound hypoxemia)

24) Do you agree that failure to transfer a patient to an appropriate facility is an important contributor to POTENTIALLY AVOIDABLE cardiac arrests?

Strongly Agree
 Agree
 Neither disagree nor agree
 Disagree
 Strongly Disagree
 Prefer not to answer

25) Do you agree that it is feasible to assess whether failure to transfer a patient to an appropriate facility contributed to a POTENTIALLY AVOIDABLE cardiac arrest?

Strongly Agree
 Agree
 Neither disagree nor agree
 Disagree
 Strongly Disagree
 Prefer not to answer

26) Any additional comments:

Factor #9: Inappropriate or harmful therapy administered without adequate precautions taken to limit harm. This could include a patient receiving an inappropriate medication in error (i.e. high dose potassium or a documented allergic reaction) or a patient receiving a high-risk therapy (i.e. isoflurane for severe asthma) without precautions taken to minimize known side effects (i.e. hypotension due to isoflurane)

- 27) Do you agree that inappropriate or harmful therapy administered without adequate precautions taken to limit harm is an important contributor to POTENTIALLY AVOIDABLE cardiac arrests?
- Strongly Agree
 - Agree
 - Neither disagree nor agree
 - Disagree
 - Strongly Disagree
 - Prefer not to answer
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- 28) Do you agree that it is feasible to assess whether inappropriate or harmful therapy administered without adequate precautions taken to limit harm contributed to a POTENTIALLY AVOIDABLE cardiac arrest?
- Strongly Agree
 - Agree
 - Neither disagree nor agree
 - Disagree
 - Strongly Disagree
 - Prefer not to answer
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29) Any additional comments:

Factor #10: Lack of critical personnel available (i.e. patient with known grade 4 airway requiring video laryngoscopy experiences cardiac arrest due to a lack of advanced airway providers skilled with video laryngoscopy available)

- 30) Do you agree that lack of critical personnel available is an important contributor to POTENTIALLY AVOIDABLE cardiac arrests?
- Strongly Agree
 - Agree
 - Neither disagree nor agree
 - Disagree
 - Strongly Disagree
 - Prefer not to answer
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- 31) Do you agree that it is feasible to assess whether a lack of critical personnel available contributed to a POTENTIALLY AVOIDABLE cardiac arrest?
- Strongly Agree
 - Agree
 - Neither disagree nor agree
 - Disagree
 - Strongly Disagree
 - Prefer not to answer
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32) Any additional comments:

Factor #11: Lack of recognition of patient deterioration by medical team

- 33) Do you agree that lack of recognition of patient deterioration by the medical team is an important contributor to POTENTIALLY AVOIDABLE cardiac arrests?
- Strongly Agree
 - Agree
 - Neither disagree nor agree
 - Disagree
 - Strongly Disagree
 - Prefer not to answer
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- 34) Do you agree that it is feasible to assess whether the lack of recognition of patient deterioration by the medical team contributed to a POTENTIALLY AVOIDABLE cardiac arrest?
- Strongly Agree
 - Agree
 - Neither disagree nor agree
 - Disagree
 - Strongly Disagree
 - Prefer not to answer
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35) Any additional comments:

Factor #12: Hospital acquired infection acquired within the PICU

36) Do you agree that a hospital acquired infection acquired within the PICU is an important contributor to POTENTIALLY AVOIDABLE cardiac arrests?

Strongly Agree
 Agree
 Neither disagree nor agree
 Disagree
 Strongly Disagree
 Prefer not to answer

37) Do you agree that it is feasible to assess whether a hospital acquired infection acquired within the PICU contributed to a POTENTIALLY AVOIDABLE cardiac arrest?

Strongly Agree
 Agree
 Neither disagree nor agree
 Disagree
 Strongly Disagree
 Prefer not to answer

38) Any additional comments:

Factor #13: Failure of or faulty life supporting equipment or no availability of life supporting equipment

39) Do you agree that failure of, or faulty life supporting equipment or no availability of life supporting equipment is an important contributor to POTENTIALLY AVOIDABLE cardiac arrests?

Strongly Agree
 Agree
 Neither disagree nor agree
 Disagree
 Strongly Disagree
 Prefer not to answer

40) Do you agree that it is feasible to assess whether failure of or faulty life supporting equipment or no availability of life supporting equipment contributed to a POTENTIALLY AVOIDABLE cardiac arrest?

Strongly Agree
 Agree
 Neither disagree nor agree
 Disagree
 Strongly Disagree
 Prefer not to answer

41) Any additional comments:

Factor #14: Inadequate communication among clinicians

42) Do you agree that inadequate communication among clinicians is an important contributor to POTENTIALLY AVOIDABLE cardiac arrests?

Strongly Agree
 Agree
 Neither disagree nor agree
 Disagree
 Strongly Disagree
 Prefer not to answer

43) Do you agree that it is feasible to assess whether inadequate communication among clinicians contributed to a POTENTIALLY AVOIDABLE cardiac arrest?

- Strongly Agree
- Agree
- Neither disagree nor agree
- Disagree
- Strongly Disagree
- Prefer not to answer

44) Any additional comments:

45) Please list any additional factors that you think may contribute to POTENTIALLY AVOIDABLE cardiac arrest that were not mentioned.

Consensus reached on the importance of all 14 factors.

TWO PART EDELPHI CONSENSUS ON CONTRIBUTING FACTORS



A priori agreement consensus reached during initial assessment of contributing factors

Contributing Factors: consensus on the importance of all factors was >70% meeting the a priori set agreement threshold. Therefore we will now have you rank the factors in order of importance. Please use each number (1-14) once to rank from the most important factor that contributes to potentially avoidable cardiac arrest (1) to the least important contributing factor (14).

1) Lack of or inappropriate patient monitoring or surveillance

- 1
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- 13
- 14

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- 2) Delay or error in diagnosis
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 - 14

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- 3) Delay by physician/advanced practioner to respond to changes in patient condition
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- 4) Delay by bedside front-line providers (nurse or respiratory therapist) to inform responding physician/advanced practitioner of patient condition
- 1
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- 5) Inadequate treatment of clinical condition
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- 6) Failure to respond or prolonged time to respond to abnormal labs or to adequately interpret radiology tests
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- 7) Procedural or surgical complication while admitted to the PICU
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- 8) Failure to transfer patient to an appropriate facility (i.e. failure to transfer a patient with severe ARDS to ECMO center prior to cardiac arrest from profound hypoxemia)
- 1
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 - 14

-
- 9) Inappropriate or harmful therapy administered without adequate precautions taken to limit harm. This could include a patient receiving an inappropriate medication in error (i.e. high dose potassium or a documented allergic reaction) or a patient receiving a high-risk therapy (i.e. isoflurane for severe asthma) without precautions taken to minimize known side effects (i.e. hypotension due to isoflurane)
- 1
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 - 13
 - 14

-
- 10) Lack of critical personnel available (i.e. patient with known grade 4 airway requiring video laryngoscopy experiences cardiac arrest due to a lack of advanced airway providers skilled with video laryngoscopy available)
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- 11) Lack of recognition of patient deterioration by medical team
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- 12) Hospital acquired infection acquired within the PICU
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- 13) Failure of or faulty life supporting equipment or no availability of life supporting equipment
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 - 13
 - 14

14) Inadequate communication among clinicians

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- 14

Contributing Factors: due to the high number of factors deemed to be important (14 total). We also have grouped the factors into categories. Please review and rank the categories below with 1 being the most important and 4 being the least important. Please use each number only once.



eEstablish And Formalize Expert Criteria for Avoidable Resuscitation Review

SAFECARR eDELPHI

CONTRIBUTING FACTORS



Diagnostic Factors

1. Delay or error in diagnosis
2. Failure to respond, or prolonged time to respond to abnormal labs, or to adequately interpret radiology tests
3. Delay by physician/advanced practitioner to respond to changes in patient condition
4. Lack of recognition of patient deterioration by the medical team
5. Lack of or inappropriate patient monitoring or surveillance

Treatment/Therapeutic Factors

1. Procedural or surgical complication
2. Inappropriate or harmful therapy administered without adequate precautions taken to limit harm
3. Inadequate treatment of a clinical condition



Communication

1. Delay by bedside front-line providers (nurse or respiratory therapist) to inform responding physician/advanced practitioner of patient condition
2. Inadequate communication among clinicians

Facilities and Resources

1. Failure to transfer a patient to an appropriate facility
2. Lack of critical personnel available
3. Failure of, or faulty life supporting equipment or no availability of life supporting equipment
4. Hospital acquired infection acquired within the PICU



15) Diagnostic Factors 1
 2
 3
 4

16) Treatment/Therapeutic Factors 1
 2
 3
 4

17) Communication 1
 2
 3
 4

18) Facilities and Resources 1
 2
 3
 4

Thank you for contributing to the SAFECARR modified Delphi! We will update you on participation at AHA either in person or virtually in the new few weeks.