**APPENDIX A – First Aid Task Force Evidence to Decision Tables**

**Manual uterine massage for postpartum hemorrhage (FA 7336, SysRev 2024)**

**QUESTION**

| **Should uterine massage by lay provider vs. any other first aid intervention by lay provider be used for women experiencing postpartum hemorrhage ?** | |
|---|---|
| **POPULATION:** | People with a uterus/women experiencing postpartum hemorrhage (PPH) |
| **INTERVENTION:** | Manual external uterine massage administered by a layprovider |
| **COMPARISON:** | Any other first aid intervention to treat PPH, compared with uterine massage; No intervention done to treat PPH, compared with uterine massage |
| **MAIN OUTCOMES:** | The following is the TF approved outcomes rated into critical/important:<br>1. Maternal survival (critical)<br>2. Blood loss (critical)<br>3. Future fertility<br>4. Surgical intervention<br>5. Organ dysfunction<br>6. Pain<br>7. Blood transfusion |
| **SETTING:** | First aid in any setting, including pre-hospital and in hospital |
| **PERSPECTIVE:** | As most people giving birth worldwide do not have access to skilled health professionals, first aid interventions accessible to lay providers such as manual external uterine massage, may do substantial good in reducing morbidity and mortality from PPH. |
| **BACKGROUND:** | Post-partum hemorrhage (PPH) is the leading cause of maternal mortality and morbidity worldwide, particularly in low-income countries with limited resources. Approximately 14 million women each year experience PPH, resulting in 70,000 maternal deaths globally. Uterine massage is a maneuver which involves massaging and squeezing the lower abdomen of someone experiencing PPH to help stimulate uterine contractions and reduce hemorrhage. Many systematic reviews and international guidelines recommend external uterine massage as a part of active management of the third stage of labour for the prevention and management of PPH[1-8]. Given that attendants at most births worldwide may be considered lay or first aid providers[9], and that external uterine massage is a simple, inexpensive maneuver akin to many manual interventions taught to first aid providers, uterine massage presents an intervention for PPH appropriate for many low-resource settings served solely by lay birth attendants. Therefore, this systematic review focuses on manual external uterine massage as a treatment option for PPH by lay providers |
| **CONFLICT OF INTERESTS:** | The following Task Force members and other authors declared an intellectual conflict of interest, and this was acknowledged and managed by the Task Force Chairs and Conflict of Interest committees: Dr. Grethe Heitmann and Dr. Justus Hofmeyr. |

**ASSESSMENT**

| **Problem**<br>Is the problem a priority? | | |
|---|---|---|
| **JUDGEMENT** | **RESEARCH EVIDENCE** | **ADDITIONAL CONSIDERATIONS** |
| ○ No<br>○ Probably no<br>○ Probably yes<br>● Yes<br>○ Varies<br>○ Don't know | Post-partum hemorrhage (PPH) remains the leading cause of maternal mortality and morbidity worldwide, particularly in low resource settings. There are no ILCOR recommendations for first aid response to PPH, and there is a dearth of research on first aid interventions for PPH in current literatures. | Uterine massage is an inexpensive, easily taught treatment option that many systematic reviews and international guidelines recommend as part of active management of the third stage of labour for the prevention and management of PPH, which may provide a |

| | | |
|---|---|---|
| | | treatment option in low-resource settings with poor access to skilled provider[1-8]. |
| **Desirable Effects**<br>How substantial are the desirable anticipated effects? | | |
| **JUDGEMENT** | **RESEARCH EVIDENCE** | **ADDITIONAL CONSIDERATIONS** |
| ○ Trivial<br>○ Small<br>○ Moderate<br>○ Large<br>○ Varies<br>● Don't know | The systematic review search identified 1558 studies for screening, of which 18 were selected for full-text screening. One RCT[10] was included.<br>**Blood loss**<br>For the critical outcome of blood loss, we identified very-low-certainty evidence (include why downgraded) from one RCT. In Ngichabe et al., people who recently gave birth were advised to perform self-massage queued by an alarm every 15 minutes for the first 120 minutes after birth. Volume of blood loss was measured by weighing a dry sanitary towel provided to each participant, and was compared between alarm and non-alarm groups. Ngichabe et al. measured average blood loss after two hours of uterine massage with alarm reminders to be 45.6 mL (43-46, 95% CI). In the non-alarm group, they measured the average blood loss after two hours of uterine massage without alarm reminders to be 47.1 mL (43-52, 95% CI). They reported a p-value of 0.892, indicating no statistically significant difference in the average blood loss between groups.<br>**Blood transfusion**<br>For the important outcome of blood transfusion, we identified very-low-certainty evidence (include why downgraded) in Ngichabe et al. Blood transfusion was reported qualitatively in the study. The authors noted that two out of 56 participants in the non-alarm group who were not complying to uterine massage developed excessive bleeding and required transfusion 45 minutes into the study. The study authors reported that the average blood loss of these two patients was 98 mL, and that they required two pints of blood each. No participants in the alarm group required blood transfusion. | |
| **Undesirable Effects**<br>How substantial are the undesirable anticipated effects? | | |
| **JUDGEMENT** | **RESEARCH EVIDENCE** | **ADDITIONAL CONSIDERATIONS** |
| ○ Trivial<br>○ Small<br>○ Moderate<br>○ Large<br>○ Varies<br>● Don't know | In Ngichabe et al[10]., there were no reported complications in the alarm group after beginning massage monitoring. | |
| **Certainty of evidence**<br>What is the overall certainty of the evidence of effects? | | |
| **JUDGEMENT** | **RESEARCH EVIDENCE** | **ADDITIONAL CONSIDERATIONS** |

| | | |
|---|---|---|
| ● Very low<br>○ Low<br>○ Moderate<br>○ High<br>○ No included studies | The certainty of evidence was interpreted as very low due to the single, lower-quality RCT, with limited and not statistically significant findings concerning the outcomes of interest. | |

**Values**
Is there important uncertainty about or variability in how much people value the main outcomes?

| JUDGEMENT | RESEARCH EVIDENCE | ADDITIONAL CONSIDERATIONS |
|---|---|---|
| ○ Important uncertainty or variability<br>○ Possibly important uncertainty or variability<br>○ Probably no important uncertainty or variability<br>● No important uncertainty or variability | There is no important uncertainty of variability in how much people value the critical outcomes of maternal survival and blood loss, or the important outcomes of future fertility, surgical intervention, organ dysfunction, pain, and blood transfusion. | |

**Balance of effects**
Does the balance between desirable and undesirable effects favor the intervention or the comparison?

| JUDGEMENT | RESEARCH EVIDENCE | ADDITIONAL CONSIDERATIONS |
|---|---|---|
| ○ Favors the comparison<br>○ Probably favors the comparison<br>○ Does not favor either the intervention or the comparison<br>○ Probably favors the intervention<br>○ Favors the intervention<br>○ Varies<br>● Don't know | Due to the uncertainty of evidence, it is difficult to balance the undesirable and desirable effects in favour of the intervention or comparison. | The First Aid Task Force recommends uterine massage (weak recommendation), as it is a simple and safe physical maneuver, equivalent to other physical interventions routinely taught to first aid providers, and since PPH is a major source of morbidity and mortality worldwide, particularly in settings with limited access to skilled health care. As such, the TF places a higher value on uterine massage for lay providers and its possible desirable effects in reducing morbidity and mortality from PPH, balanced against the possible risks. |

**Resources required**

| JUDGEMENT | RESEARCH EVIDENCE | ADDITIONAL CONSIDERATIONS |
|---|---|---|
| ○ Large costs<br>○ Moderate costs<br>● Negligible costs and savings<br>○ Moderate savings<br>○ Large savings<br>○ Varies<br>○ Don't know | No studies examined the cost of manual uterine external massage. | Although the included study by Ngichabe et al[10] did not report how participants were taught to perform uterine massage, nor the costs associated with training participants, uterine massage is a simple physical maneuver equivalent to many manual interventions taught to first aid and lay providers. There would be few materials required to train lay providers to perform uterine massage, and the amount of training required to perform this maneuver is minimal. |

| | | |
|---|---|---|
| | | Therefore, the associated costs for training lay providers to perform uterine massage are likely negligible. |

**Certainty of evidence of required resources**
What is the certainty of the evidence of resource requirements (costs)?

| JUDGEMENT | RESEARCH EVIDENCE | ADDITIONAL CONSIDERATIONS |
|---|---|---|
| ○ Very low<br>○ Low<br>○ Moderate<br>○ High<br>● No included studies | As Ngichabe et al[10]. did not provide details on how they trained participants to perform uterine massage, there is no data for the necessary resources to train lay providers to perform uterine massage. | |

**Cost effectiveness**
Does the cost-effectiveness of the intervention favor the intervention or the comparison?

| JUDGEMENT | RESEARCH EVIDENCE | ADDITIONAL CONSIDERATIONS |
|---|---|---|
| ○ Favors the comparison<br>○ Probably favors the comparison<br>○ Does not favor either the intervention or the comparison<br>● Probably favors the intervention<br>○ Favors the intervention<br>○ Varies<br>○ No included studies | Cost effectiveness was not addressed in the included study. | External uterine massage has no direct cost, so it probably favours the intervention. |

**Equity**
What would be the impact on health equity?

| JUDGEMENT | RESEARCH EVIDENCE | ADDITIONAL CONSIDERATIONS |
|---|---|---|
| ○ Reduced<br>○ Probably reduced<br>○ Probably no impact<br>● Probably increased<br>○ Increased<br>○ Varies<br>○ Don't know | Very few of the characteristics listed in the Cochrane checklist for equity, PROGRESS-Plus, were reported in the included study. It was noted that despite the various education levels of participants, no difficulty learning or performing uterine massage was reported, indicating that uterine massage may be an accessible intervention for people of many education levels. | PPH is a condition that results in maternal morbidity and mortality, increasing health inequities for women and dependent children. Improved care and prevention for PPH can therefore improve health equity. PPH also disproportionately affects people giving birth in lower-resource settings, so improved first aid management of PPH may therefore improve health equity.<br>Additionally, the simplicity and ease of the maneuver suggests that uterine massage taught to lay providers may be particularly useful in low-resource settings, where people giving birth often do not have access to a skilled health provider. |

**Acceptability**
Is the intervention acceptable to key stakeholders?

| JUDGEMENT | RESEARCH EVIDENCE | ADDITIONAL CONSIDERATIONS |
|---|---|---|
| ○ No<br>○ Probably no<br>● Probably yes<br>○ Yes<br>○ Varies<br>○ Don't know | The included study did not address acceptability to key stakeholders. However, the included study measured compliance to a protocol of self-administered uterine massage, resulting in 67% compliance at 120 minutes in the intervention group versus 9% compliance in the control group (p-value <0.0001). This high level of compliance in the intervention group demonstrates the acceptability of the intervention to the participants. | Due to the various reviews and guidelines which recommend external uterine massage as part of active management of the third stage of labour of the prevention and management of PPH[1-8]., it is very likely that this intervention is acceptable to stakeholders. |

**Feasibility**
Is the intervention feasible to implement?

| JUDGEMENT | RESEARCH EVIDENCE | ADDITIONAL CONSIDERATIONS |
|---|---|---|
| ○ No<br>○ Probably no<br>● Probably yes<br>○ Yes<br>○ Varies<br>○ Don't know | The included study reported no participant difficult in learning or performing uterine massage. Additionally, the included study measured compliance to a protocol of self-administered uterine massage, resulting in 67% compliance at 120 minutes in the intervention group versus 9% compliance in the control group (p-value <0.0001). This high level of compliance in the intervention group demonstrates the feasibility of the intervention. | Given the simplicity of uterine massage, it is likely feasible to implement as a part of first aid curricula. |

**SUMMARY OF JUDGEMENTS**

| | JUDGEMENT | | | | | | |
|---|---|---|---|---|---|---|---|
| **PROBLEM** | No | Probably no | Probably yes | **Yes** | | Varies | Don't know |
| **DESIRABLE EFFECTS** | Trivial | Small | Moderate | Large | | Varies | **Don't know** |
| **UNDESIRABLE EFFECTS** | Trivial | Small | Moderate | Large | | Varies | **Don't know** |
| **CERTAINTY OF EVIDENCE** | **Very low** | Low | Moderate | High | | | No included studies |
| **VALUES** | Important uncertainty or variability | Possibly important uncertainty or variability | Probably no important uncertainty or variability | **No important uncertainty or variability** | | | |
| **BALANCE OF EFFECTS** | Favors the comparison | Probably favors the comparison | Does not favor either the intervention or the comparison | Probably favors the intervention | Favors the intervention | Varies | **Don't know** |
| **RESOURCES REQUIRED** | Large costs | Moderate costs | **Negligible costs and savings** | Moderate savings | Large savings | Varies | Don't know |
| **CERTAINTY OF EVIDENCE OF REQUIRED RESOURCES** | Very low | Low | Moderate | High | | | **No included studies** |

| | JUDGEMENT | | | | | | |
|---|---|---|---|---|---|---|---|
| **COST EFFECTIVENESS** | Favors the comparison | Probably favors the comparison | Does not favor either the intervention or the comparison | Probably favors the intervention | Favors the intervention | Varies | **No included studies** |
| **EQUITY** | Reduced | Probably reduced | Probably no impact | **Probably increased** | Increased | Varies | Don't know |
| **ACCEPTABILITY** | No | Probably no | **Probably yes** | Yes | | Varies | Don't know |
| **FEASIBILITY** | No | Probably no | **Probably yes** | Yes | | Varies | Don't know |

**TYPE OF RECOMMENDATION**

| Strong recommendation against the intervention | Conditional recommendation against the intervention | Conditional recommendation for either the intervention or the comparison | **Conditional recommendation for the intervention** | Strong recommendation for the intervention |
|---|---|---|---|---|
| ○ | ○ | ○ | ● | ○ |

**CONCLUSIONS**

## Recommendation

We suggest external uterine massage, including self-massage, in the immediate postpartum period in comparison with no intervention to prevent postpartum hemorrhage, which can lead to maternal death (weak recommendation, very low certainty of evidence).
**Technical remarks:** In the sole included study[10], people who recently gave birth were advised to perform self-massage queued by an alarm every 15 minutes for the first 120 minutes after birth. The details of how participants were taught to perform the external uterine massage was not reported. This study occurred in an in-hospital setting.
The immediate postpartum period, or fourth stage of labour, refers to the first three hours after birth.

## Justification

This topic was prioritized by the FA Task Force based on the observation that (a) many systematic reviews and international guidelines recommend external uterine massage as a part of active management of the third stage of labour for the prevention and management of PPH, (b) external uterine massage is a simple and safe physical maneuver equivalent to many manual interventions taught to first aid and lay providers, (c) that PPH is a major cause of global morbidity and mortality and gender-based health inequity, (d) that attendants at most births worldwide have limited professional health education and may be considered lay or first aid providers[9], (e) that intrapartum and postnatal care has traditionally been omitted from the first aid corpus, and that (f) first aid interventions designed to serve low-resource settings and particularly people giving birth in these settings may therefore do substantial good by reducing morbidity and mortality.

In making this recommendation, the FA Task force considered:
• That external uterine massage is a ubiquitous standard for professional birth attendants and first responders for the prevention and management of PPH.
• That external uterine massage is a simple and safe physical maneuver, equivalent to other physical interventions routinely taught to first aid providers (e.g.: moving a patient, splinting an injured limb, applying direct pressure or a tourniquet to a bleeding wound).
• That PPH is a major source of global morbidity and mortality, especially in settings with limited or no access to professional healthcare providers, professional prehospital care, hospital care, or professional birth attendants. Therefore, recommendations that limit external uterine massage to professionalized contexts would potentially compound health inequities.
• We considered that first aid includes self-management for the prevention and treatment of time-sensitive conditions.

• In making a weak recommendation, we considered that only a single RCT was identified where postnatal patients were taught to administer self-external uterine massage and that the study did not demonstrate a statistically significant reduction in the volume of postpartum hemorrhage or transfusion. It did however demonstrate that external uterine massage can be taught to lay providers.
• We also considered that the only available study involving lay providers occurred in hospital.

## Subgroup considerations

We initially considered conducting subgroup analyses based on location, and comparing interventions which occurred in low-income and middle-income countries to those which occurred in high-income countries. However, as we only identified one study, this was not possible.

## Implementation considerations

None

## Monitoring and evaluation

See above

## Research priorities

- There were a few excluded studies which reported on manual uterine external massage done by trained health professionals, extrapolating that it could be an effective intervention for lay provider use. As such, more studies with robust methodology examining lay provider use of manual uterine external massage, particularly in out of hospital settings, are needed.
- More studies examining non-self lay providers, such as traditional birth attendants, are needed.
- Pressure/firmness of the uterine massage may affect the effectiveness of the intervention, the included study could not measure or regulate the strength/firmness of the uterine massage by study participants, and did not describe if or how this was controlled or taught.
- As primary PPH can occur up to 24 hours after the birth of a baby, it is possible that symptoms of PPH occurred after the intervention, as patients in the included study were only monitored for 120 minutes, and did not receive follow-up.
- Aspects of equity were not well reported in the included study, and may affect the care received by people experiencing PPH.

**Unintentional injury from CPR (FA 7670, BLS 353, SysRev 2024)**

**QUESTION**

| Unintentional injury from chest compressions to patients not in cardiac arrest | |
|---|---|
| **POPULATION** | Among adults and children who are not in cardiac arrest out-side of a hospital |
| **INTERVENTIO** | Provision of chest compressions from laypersons |
| **COMPARISO** | No use of chest compressions |
| **MAIN OUTCOMES:** | Survival with favorable neurological/functional outcome at discharge, 30 days, 60 days, 180 days, and/or 1 year; unintentional physical injury (previous 'harm') (e.g. rib fracture, bleeding); risk of injury (e.g. aspiration) |
| **SETTING:** | Out-of-hospital |
| **PERSPECTIV E:** | Patient perspective |
| **BACKGROUN D:** | Many lay persons are concerned that delivering chest compressions to a person who is not in cardiac arrest could lead to serious injuries and thus, are reluctant to initiate CPR, even when a person is in cardiac arrest. It is further difficult to rapidly assess if a person is in cardiac arrest or is unconscious and has bradypnea.<br>The 2020 International Liaison Committee on Resuscitation (ILCOR) review, for the important outcome of "harm," identified very-low-certainty evidence and concluded with a strong recommendation ("We |
| **CONFLI CT OF** | None |

**ASSESSMENT**

| **Problem**<br>Is the problem a priority? | | |
|---|---|---|
| **JUDGEMENT** | **RESEARCH EVIDENCE** | **ADDITIONAL CONSIDERATIONS** |
| ○ No<br>○ Probably no<br>○ Probably yes<br>• Yes<br>○ Varies<br>○ Don't know | Cardiopulmonary resuscitation has been established as a critical step in the "chain of survival" for victims of sudden cardiac arrest (Cummins et al 1991). Complications by doing CPR on patients not in cardiac arrest occur infrequently. It is reasonable to perform immediate CPR initiated by laypersons for patients in cardiac arrest against the low risk of injury in patients not in cardiac arrest.<br>The ILCOR Basic Life Support Task Force prioritized this PICOST as a systematic review as it had not been reviewed since the 2015 Guidelines. The systematic review underlying the COSTR was never published. The PCOST was transferred to ILCORs First Aid task force in 2023 and an updated review was undertaken. | Pooled data from the five included studies on 1031 patients shown a frequency of less than 1 % on unintentional injury or risk of such. |
| **Desirable Effects**<br>How substantial are the desirable effects? | | |
| **JUDGEMENT** | **RESEARCH EVIDENCE** | **ADDITIONAL CONSIDERATIONS** |

| | | |
|---|---|---|
| ○ Trivial<br>○ Small<br>○ Moderate<br>● Large<br>○ Varies<br>○ Don't know | The FA Task Force considered the likely survival benefit of CPR initiated by lay persons for patients in cardiac arrest to outweigh the low risk of injury in patients not in cardiac arrest. | Chest compressions should be started within seconds according to guidelines. Recognition of a cardiac arrest within that timeframe for both a lay person and a dispatcher might be challenging. The task force (TF) values starting chest compressions far greater than a delay to such by adding time for recognition of cardiac arrest. |

| **Undesirable Effects**<br>How substantial are the undesirable anticipated effects? | | |
|---|---|---|
| **JUDGEMENT** | **RESEARCH EVIDENCE** | **ADDITIONAL CONSIDERATIONS** |
| ○ Large<br>○ Moderate<br>○ Small<br>○ Trivial<br>○ Varies<br>• Don't know | Case reports and case series of serious injuries to persons receiving CPR who are not in cardiac arrest are considered likely to be published as they are of general interest to a broad group of health care providers.<br><br>The overall reported percentage of patients with undersireunintentional injuries was <1%. This strengthens the belief that the desirable effects will far outweigh undesirable effects. | |
| **Certainty of evidence**<br>What is the overall certainty of the evidence of effects? | | |
| **JUDGEMENT** | **RESEARCH EVIDENCE** | **ADDITIONAL CONSIDERATIONS** |
| • Very low<br>○ Low<br>○ Moderate<br>○ High<br>○ No included studies | The evidence is of observational studies and case series only. Many studies reported zero injuries or risk of complications although this may be due to underreporting secondary to lack of standardized follow-up in these category of patients and a substantial portion of the patients being discharged after assessment in the emergency department. | |
| **Values**<br>Is there important uncertainty about or variability in how much people value the main outcomes? | | |
| **JUDGEMENT** | **RESEARCH EVIDENCE** | **ADDITIONAL CONSIDERATIONS** |
| ○ Important uncertainty or variability<br>○ Possibly important uncertainty or variability<br>○ Probably no important uncertainty or variability<br>• No important uncertainty or variability | There is little uncertainty about people valuing survival from cardiac arrest.<br>The First Aid (FA) Task Force believes risk from CPR to patients not in cardiac arrest (but with a condition serious enough to be mistaken for a cardiac arrest) is acceptable to the general population given the potential benefits of early CPR in cardiac arrest. | |
| **Balance of effects**<br>Does the balance between desirable and undesirable effects favor the intervention or the comparison? | | |
| **JUDGEMENT** | **RESEARCH EVIDENCE** | **ADDITIONAL CONSIDERATIONS** |

| | | |
|---|---|---|
| ○ Favors the comparison<br>○ Probably favors the comparison<br>○ Does not favor either the intervention or the comparison<br>• Probably favors the intervention<br>○ Favors the intervention<br>○ Varies<br>○ Don't know | In making this recommendation, we place a higher value on the survival benefit of CPR initiated by laypersons for patients in cardiac arrest, and lower value to what is believed to be minimal risk of injury to patients not in cardiac arrest. | |

**Resources required**
How large are the resource requirements (costs)?

| JUDGEMENT | RESEARCH EVIDENCE | ADDITIONAL CONSIDERATIONS |
|---|---|---|
| ○ Large costs<br>○ Moderate costs<br>○ Negligible costs and savings<br>○ Moderate savings<br>○ Large savings<br>• Varies<br>○ Don't know | No studies examined costs. | |

**Certainty of evidence of required resources**
What is the certainty of the evidence of resource requirements (costs)?

| JUDGEMENT | RESEARCH EVIDENCE | ADDITIONAL CONSIDERATIONS |
|---|---|---|
| ○ Very low<br>○ Low<br>○ Moderate<br>○ High<br>• No included studies | | |

**Cost effectiveness**
Does the cost-effectiveness of the intervention favor the intervention or the comparison?

| JUDGEMENT | RESEARCH EVIDENCE | ADDITIONAL CONSIDERATIONS |
|---|---|---|
| ○ Favors the comparison<br>○ Probably favors the comparison<br>○ Does not favor either the intervention or the comparison<br>○ Probably favors the intervention<br>○ Favors the intervention<br>○ Varies<br>• No included studies | No studies examined the cost-effectiveness. | |

**Equity**
What would be the impact on health equity?

| JUDGEMENT | RESEARCH EVIDENCE | ADDITIONAL CONSIDERATIONS |
|---|---|---|
| ○ Reduced<br>○ Probably reduced<br>○ **Probably no impact**<br>Probably increased<br>○ Increased<br>○ Varies<br>○ Don't know | No studies examined health equity. | Very few of the characteristics listed in the Cochrane checklist for equity, PROGRESS Plus, were reported in the included studies.<br>However, it was noted that the layperson often had some kind of relation to the victim, either as a family member or personnel at a nursing home. They might both fear harm and prioritize survival. |

**Acceptability**
Is the intervention acceptable to key stakeholders?

| JUDGEMENT | RESEARCH EVIDENCE | ADDITIONAL CONSIDERATIONS |
|---|---|---|
| ○ No<br>○ Probably no<br>• Probably yes<br>○ Yes<br>○ Varies<br>○ Don't know | No studies examined acceptability. | |

**Feasibility**

| JUDGEMENT | RESEARCH EVIDENCE | ADDITIONAL CONSIDERATIONS |
|---|---|---|
| ○ No<br>○ Probably no<br>○ Probably yes<br>○ Yes<br>• Varies | No studies examined feasibility. | |

**SUMMARY OF JUDGEMENT**

| | JUDGEMENT | | | | | | |
|---|---|---|---|---|---|---|---|
| **PROBLEM** | No | Probably no | Probably yes | **Yes** | | Varies | Don't know |
| **DESIRABLE** | Trivial | Small | Moderate | **Large** | | Varies | Don't know |
| **UNDESIRABLE** | Large | Moderate | Small | Trivial | | Varies | **Don't know** |
| **CERTAINTY OF** | **Very low** | Low | Moderate | High | | | No included studies |
| **VALUES** | Important uncertainty or variability | Possibly important uncertainty or variability | Probably no important uncertainty or variability | **No important uncertainty or** | | | |
| **BALANCE OF EFFECTS** | Favors the comparison | Probably favors the comparison | Does not favor either the intervention or | **Probably favors the intervention** | Favors the intervention | Varies | Don't know |
| **RESOURCES REQUIRED** | Large costs | Moderate costs | Negligible costs and | Moderate savings | Large savings | **Varies** | Don't know |
| **CERTAINTY OF EVIDENCE OF REQUIRED** | Very low | Low | Moderate | High | | | **No included studies** |
| **COST EFFECTIVENESS** | Favors the comparison | Probably favors the comparison | Does not favor either the intervention or | Probably favors the intervention | Favors the intervention | Varies | **No included studies** |
| **EQUITY** | Reduced | Probably reduced | **Probably no impact** | Probabl y increase | Increased | Varies | Don't know |
| **ACCEPTABILITY** | No | Probably no | **Probably yes** | Ye | | Varies | Don't know |
| **FEASIBILITY** | No | Probably no | Probably yes | Ye | | **Varies** | Don't know |

**TYPE OF RECOMMENDATION**

| Strong recommendation against the intervention | Conditional recommendation against the intervention | Conditional recommendation for either the intervention or the comparison | Conditional recommendation for the intervention | Strong recommendation for the intervention |
|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ● |

**CONCLUSIONS**

## Recommendation

We recommend that laypersons initiate CPR for presumed cardiac arrest without concerns of causing unintentional injury (Strong recommendation, low certainty evidence).

We recommend that other rescuers (e.g., trained bystanders, health care professionals and those with a duty to respond) initiate CPR for presumed cardiac arrest without concerns of unintentional injury to patients not in cardiac arrest (Good practice statement).

## Justification

- In making this discordant recommendation, the FA Task Force placed a much higher value on the

potential survival benefits of CPR initiated by lay persons for patients in cardiac arrest, and a lower value on the low risk of injury in patients not in cardiac arrest. The intention of this recommendation is to strongly encourage and support lay persons who are willing to initiate CPR in any setting when they believe someone to have suffered from a cardiac arrest.

- The included studies focused on lay persons, i.e. not other persons such as health care professionals or those with a duty to response who might be fully or partly trained in first aid and CPR, but the TF believe that the benefit of starting CPR outweigh the injuries and used the indirect evidence to make a good practice statement.
- Three studies were on different dispatcher protocols for CPR and it might be possible to use the result to support emergency medical dispatchers or telecommunicators in their efforts to provide telephone assisted CPR instructions in suspected cardiac arrest calls, but the TF felt that it is beyond the scope of first aid.
- The incidence of chest wall bone fractures was substantially lower than the incidence reported after CPR in patients who were in cardiac arrest. This is likely the result of shorter duration of CPR (most often less than 5 min) initiated by laypersons but stopped by professional rescuers. However, the possibility of under reporting due to non-systematic diagnostic studies cannot be excluded

## Implementation considerations

In making this discordant recommendation, the FA Task Force placed a higher value on the potential survival benefits of CPR initiated by lay persons for patients in cardiac arrest, and a lower value on the low risk of injury in patients not in cardiac arrest. The intention of this recommendation is to strongly encourage and support lay persons who are willing to initiate CPR in any setting when they believe someone to have suffered a cardiac arrest.

- The included studies focused on lay persons, i.e. not other persons such as health care professionals or those with a duty to response who might be fully or partly trained in first aid and CPR, but the TF believe that the benefit of starting CPR outweigh the harm and used the indirect evidence to make a good practice statement.
- Three studies were on different dispatcher protocols for CPR and it might be possible to use these results to support emergency medical dispatchers or telecommunicators in their efforts to provide telephone assisted CPR instructions in suspected cardiac arrest calls, but the TF felt this to be beyond the scope of first aid.
- The incidence of chest wall bone fractures was substantially lower than the incidence reported after CPR in patients who were in cardiac arrest. This is likely the result of shorter duration of CPR (most often less than 5 min) initiated by laypersons but stopped by professional rescuers. However, the possibility of under reporting due to non-systematic diagnostic studies cannot be excluded.

## Monitoring and evaluation

Registries on out-of-hospital cardiac arrest (OHCA) and suspected OHCA might allow for identification of unintentional injury.

## Research priorities

Current knowledge gaps include but are not limited to:

- More studies are needed with robust methodology to identify unintentional injuries and provide follow-up after hospital discharge.
- There is a possibility of under reporting due to nonsystematic diagnostic studies. Further, as follow up was limited (i.e. many patients were discharged from the ED), it is possible that symptoms occur later.
- Only one study included people under 18 years. Children might have a different pattern of both causes and injuries.
- The included studies were from the United States and Asia. Attitudes towards performing layperson CPR might differ between cultures.
- Few aspects of equity were reported in studies, the use of a structure such as Cochranes

PROGRESS Plus might increase reporting.

Equity statement:
Few aspects of equity were reported in studies. The use of a structure equity assessment, such as the Cochrane PROGRESS Plus tool, might increase reporting. The proportion of men and women were roughly equal in the studies. However, in three studies the layperson often had some kind of relationship to the victim, either as a family member or personnel at a nursing home. They might both fear causing an injury and prioritize survival.

**Treatment of jellyfish stings (FA 7211, SysRev 2024)**

**QUESTION**

| **Should hot water or chemical treatments be used for jellyfish stings?** | |
|---|---|
| **POPULATION:** | Adults and children with a suspected jellyfish sting |
| **INTERVENTION:** | Any pain reducing or harm minimizing technique (or combination of techniques) appropriate for first aid, such as vinegar, sea water, topical anesthetics, meat tenderizer, cold packs, urine, wet sand rubs, aloe, other commercial topical products (i.e., Sting No More), or pressure bandaging with immobilization. |
| **COMPARISON:** | Heat or cold treatment in any form appropriate for first aid (hot/cold water, hot rocks, hot packs, cold packs) or no treatment |
| **MAIN OUTCOMES:** | Pain reduction (yes/no or amount), Time to pain reduction, Survival, Need for hospitalization, Adverse effects/complications (hypothermia, burns, worsening of pain, anaphylaxis, Irukandji syndrome) |
| **SETTING:** | Beachside, hospital and laboratory |
| **PERSPECTIVE:** | Of the first aid provider and/or patient |
| **BACKGROUND:** | Jellyfish stings are most common during summer months when beaches and coastal waters are invaded by vacationers. Traditional first aid treatment is often based on bench research with the surrogate marker of envenomation being ability of the treatment to inhibit nematocyst discharge. However, more clinical data is emerging regarding these traditional first aid treatments on patient centered outcomes. This review is conducted as part of a Cochrane Systematic review on the treatment of jellyfish stings. This review incorporated randomized and non-randomized human studies on the treatment of jellyfish stings. |
| **CONFLICT OF INTERESTS:** | None |

**ASSESSMENT**

| **Problem**<br>Is the problem a priority? | | |
|---|---|---|
| **JUDGEMENT** | **RESEARCH EVIDENCE** | **ADDITIONAL CONSIDERATIONS** |
| ○ No<br>○ Probably no<br>○ Probably yes<br>● Yes<br>○ Varies<br>○ Don't know | Jellyfish are found throughout the world's oceans, but stings are more common in tropical waters. (Cegolon 2013 523) Jellyfish stings are also most common during summer months when beaches and coastal waters are frequented by vacationers. It is estimated that up to 150 million people are stung by jellyfish throughout the world each year, and at times hundreds occur in one day at a single beach making this a public health problem. (Boulware 2006 166; Bernardo 2004; Taylor 2018) The concern is primarily for people living along coastline, but varies by region and throughout the world. While many species only produce local morbidity, some species can produce systemic morbidity and mortality. Most stings cause a local reaction that do not require care in an emergency department. A survey of jellyfish stings in Hawaii found only 116 cases seen in the ED over 8 years. (Thomas 2001 100)<br>1. Cegolon L, Heymann WC, Lange JH, Mastrangelo G. Jellyfish stings and their management: a review. Mar Drugs. 2013 Feb | |

| | | |
|---|---|---|
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| **Desirable Effects**<br>How substantial are the desirable anticipated effects? | | |
| **JUDGEMENT** | **RESEARCH EVIDENCE** | **ADDITIONAL CONSIDERATIONS** |
| ○ Trivial<br>○ Small<br>○ Moderate<br>○ Large<br>● Varies<br>○ Don't know | One randomized trial {Thomas 2001 100} with low certainty evidence demonstrated a benefit in hot water over control with a mean difference in VAS of 6.4 mm (95% CI 5.8-7.0) at 5 minutes and 10.7 mm (95% CI 9.59-11.81) at 10 minutes, However, by 15 minutes there was not statistical difference between the two groups. One randomized trial {Bowra 2002 A22} with low certainty evidence demonstrated a benefit in hot water over ice packs with a mean difference in VAS at 10 minutes of 16.6 mm (95%CI 13.75-19.45). A second randomized trial {Thomas 2001 100} demonstrated a benefit in hot water over ice packs with a mean difference in VAS at 10 minutes of 8.7 mm (95% CI 7.54-9.86) and at 15 minutes of 10.9 mm (95% CI 7.27-14.53). Topical lidocaine appeared to benefit pain reduction following jellyfish stings. Topical local anesthetic appeared to demonstrate a benefit over control. Two observational studies {Birsa 2010 426; Pyo 2016 26} with very low certainty evidence noted a reduction in pain with the use of their topical lidocaine or topical benzocaine. In multiple studies ea water was used as a control and appears to cause no harm. One randomized trial demonstrated a benefit in treatment with sea water when compared to fresh water with a MD of -6.4 mm (95% CI: -2.86 to -9.94) in VAS at 5 minutes. | |
| **Undesirable Effects**<br>How substantial are the undesirable anticipated effects? | | |

| JUDGEMENT | RESEARCH EVIDENCE | ADDITIONAL CONSIDERATIONS |
|---|---|---|
| ○ Large<br>○ Moderate<br>○ Small<br>○ Trivial<br>● Varies<br>○ Don't know | In one observational study {Birsa 2010 426} with two participants both participants that applied 10% ammonia as a treatment experienced an "exacerbation of pain." In a randomized trial {DeClerck 2016} a single participant who was treated with ammonia developed a chemical burn at the application site, enrollment in this arm of the study was subsequently halted. In the Cochrane systematic review, one study (Turner 1980 300) was identified in which methylated spirits (ethanol) resulted in increased pain following jellyfish sting compared to sea water control (RR 0.1111, 95% CI 0.0145 – 0.8500 for pain reduction). Two other studies (Birsa 2010 426; Pyo 2016 26), while data is poorly reported, report less improvement in pain with ethanol and isopropyl alcohol compared to sea water control. | |
| **Certainty of evidence**<br>What is the overall certainty of the evidence of effects? | | |
| **JUDGEMENT** | **RESEARCH EVIDENCE** | **ADDITIONAL CONSIDERATIONS** |
| ● Very low<br>○ Low<br>○ Moderate<br>○ High<br>○ No included studies | Overall evidence is very low to low certainty. Randomized and non-randomized trials were often downgraded of risk of bias, due to lack of blinding, indirectness, due to being conducted in a laboratory setting, and imprecision, due to low numbers of participants. | |
| **Values**<br>Is there important uncertainty about or variability in how much people value the main outcomes? | | |
| **JUDGEMENT** | **RESEARCH EVIDENCE** | **ADDITIONAL CONSIDERATIONS** |
| ○ Important uncertainty or variability<br>○ Possibly important uncertainty or variability<br>●Probably no important uncertainty or variability<br>○ No important uncertainty or variability | No available studies | For those experiencing a sting, people would value being able to control pain. |
| **Balance of effects**<br>Does the balance between desirable and undesirable effects favor the intervention or the comparison? | | |
| **JUDGEMENT** | **RESEARCH EVIDENCE** | **ADDITIONAL CONSIDERATIONS** |

| | | |
|---|---|---|
| ○ Favors the comparison<br>○ Probably favors the comparison<br>○ Does not favor either the intervention or the comparison<br>○ Probably favors the intervention<br>○ Favors the intervention<br>● Varies<br>○ Don't know | The effects on multiple chemical solutions varied and were inconsistent. Some appeared to result in increased erythema and pain. Ammonia caused a burn and was discontinued from further use in one study.<br>Hot water either improved pain or did not differ from other studies remedies. It did not appear to result in harm in any study. In addition, lidocaine appeared beneficial in multiple studies and did not result in harm in any study. Sea water appears to be benign and either improved or has neutral when compared to fresh water. In some studies, when used as a control, it demonstrated benefit over the intervention. | |
| **Resources required**<br>How large are the resource requirements (costs)? | | |
| **JUDGEMENT** | **RESEARCH EVIDENCE** | **ADDITIONAL CONSIDERATIONS** |
| ○ Large costs<br>○ Moderate costs<br>○ Negligible costs and savings<br>○ Moderate savings<br>○ Large savings<br>● Varies<br>○ Don't know | No available studies | in this review, there was little data to suggest that commercial or home remedies were superior to washing the area with salt water. In addition, many of these commercial or home remedies are both more costly and likely less available than salt water. Salt water will likely be more accessible in underserved areas where beach and water sports may a higher source of recreation. Some evidence suggests hot water could be beneficial to help relieve pain from a jellyfish sting. This may be readily available and relatively inexpensive in some areas, whereas it may not be so in others. All interventions are likely less costly than a hospital admission, as pain likely improves over time, all interventions are more costly than no intervention.<br>Rough cost of some products is as follows:<br>Stingose, ~$20 US, 25 g<br>Adolph's meat tenderizer ~$3.00, 99g<br>Baking soda ~$1.00, 454g |

| | | |
|---|---|---|
| | | 4% lidocaine cream $5.00, 76.5g<br>Methylated spirits $8.00, 946 mL<br>Vinegar, about $1-2 US, 32 fl oz<br>Isopropyl alcohol $2-3 US 32 fl oz<br>Salt water should be freely available at the site of envenoming. Availability of fresh hot water may be greatly variable. |
| **Certainty of evidence of required resources**<br>What is the certainty of the evidence of resource requirements (costs)? | | |
| **JUDGEMENT** | **RESEARCH EVIDENCE** | **ADDITIONAL CONSIDERATIONS** |
| ○ Very low<br>○ Low<br>○ Moderate<br>○ High<br>● No included studies | No available studies | |
| **Cost effectiveness**<br>Does the cost-effectiveness of the intervention favor the intervention or the comparison? | | |
| **JUDGEMENT** | **RESEARCH EVIDENCE** | **ADDITIONAL CONSIDERATIONS** |
| ○ Favors the comparison<br>● Probably favors the comparison<br>○ Does not favor either the intervention or the comparison<br>○ Probably favors the intervention<br>○ Favors the intervention<br>○ Varies<br>○ No included studies | No available studies | The cost varies by item and geographical region. Sea water is free and avaialbe at the site of envenomation and as it demonstrates some efficacy or does not cuase harm, is likely the most cost-effective treatment. |
| **Equity**<br>What would be the impact on health equity? | | |

| JUDGEMENT | RESEARCH EVIDENCE | ADDITIONAL CONSIDERATIONS |
|---|---|---|
| ○ Reduced<br>● Probably reduced<br>○ Probably no impact<br>○ Probably increased<br>○ Increased<br>○ Varies<br>○ Don't know | No available studies | While hot water appears to be an efficacious intervention, it may not be available in all locations or to those of all socioeconomic status. In online searches, commercial products appear to be more expensive than household products or water. However, many of these commercial products are prepackages for the outdoor environment. However, household products may have to be repackaged into more convenient packages if they are going to be taken into the outdoors. |
| **Acceptability**<br>Is the intervention acceptable to key stakeholders? | | |
| **JUDGEMENT** | **RESEARCH EVIDENCE** | **ADDITIONAL CONSIDERATIONS** |
| ○ No<br>○ Probably no<br>● Probably yes<br>○ Yes<br>○ Varies<br>○ Don't know | No available studies | Commercial products, as well as household products and water are likely all acceptable interventions to key stakeholders. |
| **Feasibility**<br>Is the intervention feasible to implement? | | |
| **JUDGEMENT** | **RESEARCH EVIDENCE** | **ADDITIONAL CONSIDERATIONS** |
| ○ No<br>○ Probably no<br>● Probably yes<br>○ Yes<br>○ Varies<br>○ Don't know | No available studies | Sea water is likely to be the least costly and most readily available of the interventions. Hot water is often low cost, however, hot water may not be available or feasible in some areas, and there may be a risk of burns if the temperature of the water is too high. The studies included used a range of 40-45° C Household products may be less costly but may need to be placed in alternative |

| | | |
|---|---|---|
| | | packaging to make it more suitable for the outdoor environment. Commercial products may add an extra cost and may be less feasible in some areas of the world. |

**SUMMARY OF JUDGEMENTS**

| | JUDGEMENT | | | | | | |
|---|---|---|---|---|---|---|---|
| **PROBLEM** | No | Probably no | Probably yes | **Yes** | | Varies | Don't know |
| **DESIRABLE EFFECTS** | Trivial | Small | Moderate | Large | | **Varies** | Don't know |
| **UNDESIRABLE EFFECTS** | Large | Moderate | Small | Trivial | | **Varies** | Don't know |
| **CERTAINTY OF EVIDENCE** | **Very low** | Low | Moderate | High | | | No included studies |
| **VALUES** | Important uncertainty or variability | Possibly important uncertainty or variability | **Probably no important uncertainty or variability** | No important uncertainty or variability | | | |
| **BALANCE OF EFFECTS** | Favors the comparison | Probably favors the comparison | Does not favor either the intervention or the comparison | Probably favors the intervention | Favors the intervention | **Varies** | Don't know |
| **RESOURCES REQUIRED** | Large costs | Moderate costs | Negligible costs and savings | Moderate savings | Large savings | **Varies** | Don't know |
| **CERTAINTY OF EVIDENCE OF REQUIRED RESOURCES** | Very low | Low | Moderate | High | | | **No included studies** |
| **COST EFFECTIVENESS** | Favors the comparison | **Probably favors the comparison** | Does not favor either the intervention or the comparison | Probably favors the intervention | Favors the intervention | Varies | No included studies |
| **EQUITY** | Reduced | **Probably reduced** | Probably no impact | Probably increased | Increased | Varies | Don't know |

| | JUDGEMENT | | | | | | |
|---|---|---|---|---|---|---|---|
| **ACCEPTABILITY** | No | Probably no | **Probably yes** | Yes | | Varies | Don't know |
| **FEASIBILITY** | No | Probably no | **Probably yes** | Yes | | Varies | Don't know |

**TYPE OF RECOMMENDATION**

| Strong recommendation against the intervention | Conditional recommendation against the intervention | Conditional recommendation for either the intervention or the comparison | Conditional recommendation for the intervention | Strong recommendation for the intervention |
|---|---|---|---|---|
| ○ | ○ | ● | ○ | ○ |

**CONCLUSIONS**

## Recommendation

Following a jellyfish sting, we recommend rinsing the area of the sting with sea water. (strong recommendation, low certainty of evidence)
For non-life threatening jellyfish envenomation we suggest the use of heated water (40-45° C, 104–113° F) (immersion, irrigation or shower) or hot pack application compared with application of cold pack, topical lidocaine, benzocaine, acetic acid, Adolph's meat tenderizer, sting aid, or sodium bicarbonate, to relieve pain from a jellyfish sting. (weak recommendation, very low certainty evidence)
We recommend against the use of topical 10% ammonia, isopropanol or ethanol for the treatment of jellyfish stings. (weak recommendation, low certainty of evidence)

## Justification

In making these recommendations, the FA Task Force considered the following:

- This topic was prioritized by the FA Task Force based on the global morbidity that jellyfish stings cause throughout the world. This review was done in conjunction with the Cochrane Institute and incorporated the randomized and non-randomized trials that were not included in the Cochrane review.
- Jellyfish envenomation is a common problem along coastal areas throughout the world. While the majority of envenomations only result in local morbidity, system morbidity and mortality can occur with some species of jellyfish.
- Salt water should be available at the site of envenomation, requires no additional cost. Results using salt water as a control are mixed with some studies appearing to demonstrate benefit of vinegar, Sting-Aid and papain over sea water but other studies failing to demonstrate this benefit or even suggesting that saltwater has benefit.
- Commercially available sting relief products may be better packaged for the outdoor environment than household products which may need to be repackaged to optimize utility if used in the outdoor environment, this may increase the resources needed for household products.
- There may be differences in the efficacy of first aid treatments depending on the species of jellyfish causing the envenoming. In most instances it is not feasible for lay first aid providers to know the type of jellyfish resulting in the envenoming before beginning treatment.

- While hot water appears to demonstrate a benefit compared with other treatment, access to hot water may not be feasible in many parts of the world.

## Subgroup considerations

None

## Implementation considerations

None

## Monitoring and evaluation

None

## Research priorities

- The studies in this and the Cochrane review used a range of 40°C to 45°C, one study used hot packs that were reported to be 43°C and one study used a "hot shower" that did not report the temperature. More studies are needed to determine the optimal temperature of the hot water used for treatment.
- There are many species of jellyfish throughout the world. Inconsistencies in study results may be secondary to the species of jellyfish used. More research is needed to determine the optimal treatments for all jellyfish species.
- This review did not find data on survival or need for hospitalization. There may be other treatments that affect these outcomes that were not included in this review.

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