Appendix 1. Utstein ten-steps implementation strategy (UTIS)

Step 1. Do you have a **community-based cardiac arrest registry**?

☐ No

☐ Yes, started in (□□□□)

    If yes, please check the implementation status according to the notes below:

    ☐ Minimal status is defined as the registry has *NEITHER* quality assurance program *NOR* sufficient information on 2014 Utstein template information

    ☐ Moderate status is defined as the registry has *EITHER* quality assurance program *OR* sufficient information on 2014 Utstein template information

    ☐ Full status is defined as the registry has *BOTH* quality assurance program *AND* sufficient information on 2014 Utstein template information

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Notes:

※ Community-based cardiac arrest registry means that the registry has been continuously maintained with regularity and basic information on OHCA and CPR covering the whole community.

※ Quality assurance program includes 1) standard data dictionary for the variables 2) regular data quality management and 3) education and training for data coordinator and providers.

※ Sufficient information on 2014 Utstein template includes the registry has most factors on system, individual, structure, process, and outcomes.

Step 2. Do you have a **telephone CPR program**?

☐ No

☐ Yes, started in (□□□□)

    If yes, please check the implementation status according to the notes below:

    ☐ Minimal status is defined as the registry has *NEITHER* quality assurance program *NOR* telephone CPR registry

    ☐ Moderate status is defined as the registry has *EITHER* quality assurance program *OR* telephone CPR registry

    ☐ Full status is defined as the registry has *BOTH* quality assurance program *AND* telephone CPR registry

Step 3. Do you have a **high performance CPR program**?

☐ No

☐ Yes, started in (□□□□)

    If yes, please check the implementation status according to the notes below:

    ☐ Minimal status is defined as the registry has *NEITHER* high performance CPR training program *NOR* quality assurance program using an objective measurement tool.

    ☐ Moderate status is defined as the registry has *EITHER* high performance CPR training program *NOR* quality assurance program using an objective measurement tool.

    ☐ Full status is defined as the registry has *BOTH* high performance CPR training program *AND* quality assurance program using an objective measurement tool.

Step 4. Do you have a **rapid dispatch program**?

☐ No

☐ Yes, started in (□□□□)

If yes, please check the implementation status according to the notes below:

☐ Minimal status is defined as the rapid dispatch program has *NEITHER* rapid dispatch indication and protocol *NOR* quality assurance program.

☐ Moderate status is defined as the rapid dispatch program has *EITHER* rapid dispatch indication and protocol *OR* quality assurance program.

☐ Full status is defined as the rapid dispatch program has *BOTH* rapid dispatch indication and protocol *AND* quality assurance program.

Notes

※ Rapid dispatch program means that the community sends available vehicles and services responding to OHCA quickly within a critical time interval (such as 60 seconds)

※ Rapid dispatch indication and protocol includes target emergency condition and dispatch protocol for available vehicles and providers such as tiered response to shorten the time process.

※ Quality assurance program includes the regular training and education of dispatcher, regular review of dispatch record, and on-going feedback to the providers.

Step 5. Do you have a **measurement program of professional resuscitation** using high technology device?

☐ No

☐ Yes, started in (□□□□)

If yes, please check the implementation status according to the notes below:

☐ Minimal status is defined as the professional CPR measurement has *NEITHER* high technology devices *NOR* quality assurance program.

☐ Moderate status is defined as the professional CPR measurement has *EITHER* high technology devices *OR* quality assurance program.

☐ Full status is defined as the professional CPR measurement has *BOTH* high technology devices *AND* quality assurance program.

Step 6. Do you have a **first responder (policemen or safety guards) AED program**?

☐ No

☐ Yes, started in (□□□□)

If yes, please check the implementation status according to the notes below:

☐ Minimal status is defined as the first responder AED program has *NEITHER* education and training on first responder AED *NOR* quality assurance program of first responder defibrillation.

☐ Moderate status is defined as the first responder AED program has *EITHER* education and training on first responder AED *OR* quality assurance program of first responder defibrillation.

☐ Full status is defined as the first responder AED program has *BOTH* education and training on first responder AED *AND* quality assurance program of first responder defibrillation.

Step 7. Do you use **a smart technology to activate layperson to provide CPR and use public access defibrillator (PAD)**?

☐ No

☐ Yes, started in (☐☐☐☐)

If yes, please check the implementation status according to the notes below:

☐ Minimal status is defined as smart technology program for CPR and PAD has *NEITHER* an advanced technology for geographical information *NOR* an activation program for layperson CPR and PAD.

☐ Moderate status is defined as smart technology program for CPR and PAD has *EITHER* an advanced technology for geographical information *OR* an activation program for layperson CPR and PAD.

☐ Full status is defined as smart technology program for CPR and PAD has *BOTH* an advanced technology for geographical information *AND* an activation program for layperson CPR and PAD.

Notes

※ Smart technology program for CPR and PAD means that the community has program activate lay person to provide CPR and defibrillation using PAD via geographic information and activation program of layperson volunteer.

※ An advanced technology for geographical information includes special geographic information technology to let layperson identify the location of OHCA and the nearest PAD.

※ The activation of layperson for CPR and PAD includes the dispatch centers activate layperson volunteer for providing CPR and defibrillation with OHCA located in the nearest area.

Step 8. Do you have a **mandatory CPR training** in schools and other community areas in addition to first responders?

☐ No

☐ Yes, started in (☐☐☐☐)

If yes, please check the implementation status according to the notes below:

☐ Minimal status is defined as the mandatory CPR training covers *NEITHER* school *NOR* the other areas such as driver license applicants.

☐ Moderate status is defined as the mandatory CPR training covers *EITHER* school *OR* the other areas such as driver license applicants.

☐ Full status is defined as the mandatory CPR training covers *BOTH* school *AND* the other areas such as driver license applicants.

Notes

※ The mandatory CPR training means the community has law for obligatory CPR training in schools and other areas such as driver license applicants.

※ The mandatory school CPR includes regular program for CPR training for students and teachers based on an Act, Law, or Regulation.

※ The mandatory training program for other areas includes obligatory training for driver license applicants.

Step 9. Do you think your community has an **accountability on OHCA and CPR** outcomes?

☐ No

☐ Yes, started in (☐☐☐☐)

   If yes, please check the implementation status according to the notes below:

   ☐ Minimal status is defined when *NEITHER* the community reports OHCA information and CPR outcomes to the public annually *NOR* the community organizations share the information sufficiently.

   ☐ Moderate status is defined when *EITHER* the community reports OHCA information and CPR outcomes to the public annually *OR* the community organizations share the information sufficiently.

   ☐ Full status is defined when *BOTH* the community reports OHCA information and CPR outcomes to the public annually *AND* the community organizations share the information sufficiently.

Notes

※ The accountability on OHCA and CPR outcomes means the community reports OHCA information and CPR outcomes to the public annually and involved organizations share the information sufficiently.

※ Public reports includes the annual incidence, outcomes by rhythms, locations, bystander CPR, PAD use, and response time.

※ Information sharing includes the organizations communicate with each other, and exchange information and data for CPR program.

Step 10. Do you think your community has a **cultural excellence** for improving CPR outcomes?

☐ No

☐ Yes, started in (☐☐☐☐)

If yes, please check the implementation status according to the notes below:

☐ Minimal status is defined when *NEITHER* the medical directors play the key role for system development *NOR* host CPR-related meetings regularly.

☐ Moderate status is defined when *EITHER* the medical directors play the key role for system development *OR* host CPR-related meetings regularly.

☐ Full status is defined when *BOTH* the medical directors play the key role for system development *AND* host CPR-related meetings regularly.

Notes

※ The cultural excellence means the medical directors are actively engaged in system development, protocol, education, and quality assurance program and meet with community leaders regularly for communication, collaboration, and coordination to establish the best practice.

※ The role of medical directors includes system development, education and training, certification, and quality assurance program.

※ Leadership meeting indicates the meeting of organization leaders to meet and communicate with each other regularly for improving CPR outcomes.