

## Original Research

# A Qualitative Study Of Emergency Nurses' Basic Life Support Practices In A Ghanaian University Hospital

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### ABSTRACT

**Background:** Medical emergencies are common but Sudden Cardiac Arrest (SCA) incidences are rare; yet when they occur could be life threatening leading either to disability or death. During SCA incidents, health care professionals will be required to act skilfully and swiftly to restart the heart and stabilise the patient until advanced care can be accessed or provided. There is evidence that victims of cardio and/or respiratory arrest whilst in the hospital will have improved outcomes if Cardiopulmonary Resuscitation (CPR) is initiated within three to five minutes. The objectives of this study were to find if emergency nurses were adequately resourced to practice Basic Life Support (BLS), and the ease or difficulties with which they practice BLS.

**Methods:** This Qualitative Descriptive (QD) study was conducted at the University of Cape Coast Hospital (UCCH) between June and September 2019. Six nurses were purposively recruited for the study. All interviews were audio-recorded and transcribed verbatim. The transcription was done with Microsoft Word and transferred to Microsoft Excel for thematic analysis using an inductive descriptive approach. Data analysis took a conventional qualitative content analysis approach.

**Results:** Four of the participants were females whilst two were males. During data aggregation and analysis, 17 first-level codes were extracted from which two themes, five categories and six subcategories were obtained for discussion. The major themes were: (1) Basic Life Support (BLS) equipment and material resources, and (2) working environment and human resource.

**Conclusion:** The study found that nurses working at emergency ward at UCCH were adequately resourced and well prepared to practice BLS. They however had challenges as their work seem to be hindered by patients who present to the ward without emergency needs and unavailability of emergency drugs.

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## INTRODUCTION

Medical emergencies are common but Sudden Cardiac Arrest (SCA) incidences are rare; yet when they occur could be life threatening leading either to disability or death. During SCA incidents, health care professionals will be required to act skilfully and swiftly to restart the heart and stabilise the patient until advanced care can be accessed or provided. Preparedness therefore is key in responding effectively to real incidents of SCA. The current practices and level of preparedness of nurses working in the EW to perform Basic Life Support (BLS) will have an influence on whether they will be able to respond appropriately when faced with such emergencies in their practices. Though they are trained whilst they were students and have had some in- service training, there is currently research that have assessed their resourcefulness.

Emergency care is therefore crucial in the health care delivery system of any nation as the outcomes of patient management is greatly influenced by the swiftness by which health care professionals identify, plan, and commence treatment in emergencies. There is evidence that patients who develop cardio and/or respiratory arrest whilst in the hospital will have improved outcomes if Cardiopulmonary Resuscitation (CPR) is initiated with three to five minutes after the onset of the incidence (Saramma, Suja, Dash, & Sarma, 2016).

Nurses are considered as first responders in attending to in-hospital Cardiac Arrest (IHCA) victims as establish by Guetterman et al. (2019) in addition to being members of the resuscitation team and clinical or administrative leaders. If effective BLS which is defined as: *“the maintenance of airway patency and the support of breathing and circulation without the use of equipment other than protective devices”* (Perkins et al., 2015. p81), is performed within three to five minutes after SCA, increases the chances of survival of the victim (Saramma, Suja, Dash, & Sarma, 2016).

Modern era CPR was introduced by Kouwenhoven, Jude, and Knickerbocker in 1960, when the trio published their classic work on closed chest cardiac massage and emphasized the ease with which people can perform CPR as: *“anyone, anywhere, can now initiate cardiac resuscitative procedures, all that is needed are two hands”* (Kouwenhoven, Jude, & Knickerbocker, 1960). The authors described the benefits of external chest compressions and confirmed that when the technique was performed on 20 patients, there was an overall permanent survival rate of 70%. About 43 years after this publication, Peberdy et al. (2003) found in a prospective, multisite, observational study of in-hospital cardiac arrest outcomes in 207 USA hospitals an overall survival-to- hospital discharge rate after a cardiac arrest to be 17%. Similarly, a study in the United Kingdom (the BRESUS study) eleven years earlier, had found the rate of survival-to- hospital discharge to be 21% (Tunstall-Pedoe et al., 1992).

The lack of significant progress over the years in increasing the chances of survival of Sudden Cardiac Arrest (SCA) victims in an era of technological advancement could be a result of either lack of knowledge acquisition and/or retention, or skills acquisition and retention, or the unwillingness of health professionals to initiate CPR. A qualitative study in selected hospitals in the Volta Region of Ghana (Atakro, Ninnoni, Adatar, Gross, & Agbavor, 2016) with the aim to explore challenges experienced by Registered General Nurses working in the EW found that lack of preparation for EW role; verbal abuse from patients’ relatives; lack of resources; stressful and time consuming nature of EW, and overcrowding as major challenges in the EW.

Similarly, a study Afaya et al., (2021) aimed at exploring the challenges experienced by nurses working in the EW of a secondary referral hospital in Ghana, found overcrowding; understaffing; lack of emergency equipment; and inadequate managerial support as major issues confronting EW staff. The purpose of this qualitative study was to

explore the challenges experienced by nurses practicing at the University of Cape Coast Hospital concerning their BLS resources availability and practices. The main aim of this study was to explore the BLS practices of emergency nurses practicing in the University of Cape Coast Hospital. The other purpose of study are to determine if nurses working at the emergency unit of the UCCH are adequately prepared and resourced to practice BLS and to ascertain challenges emergency nurses face in their practice of BLS at the UCCH.

## **MATERIALS AND METHOD**

This Qualitative Descriptive (QD) study was carried out to study nurses working in the Emergency Ward's BLS practices at UCCH. QD research studies seek to discover and understand a phenomenon, a process, or the perspectives and worldviews of the people involved. To stay true to the intent of QD, the data is presented as a description of the patterns and themes that emerged from the data but not re-presented (Sandelowski, 2010), since the intent of the methodology was to provide a descriptive summary of the data collected without transforming the data through the author's interpretation.

The study's focus was on emergency nurses practicing in the University of Cape Coast Hospital (UCCH). The hospital is an 80-bed capacity district-level health facility. The facility has a catchment population of 35,624 (excluding students and workers population). The hospital has a 10-bed emergency ward that attends to all manner of emergency clients. The emergency ward attended to 3,623 patients between January and December 2020. The study had ethical approval from the Institutional Review Board of the University of Cape Coast (UCCIRB/EXT/2019/06), permission was also sought from the management of UCCH to use the facility for the study.

The target population for the study was all nurses practicing in the emergency ward at UCCH. Six (6) nurses were purposively selected due to their availability and experience to be interviewed. The participants were contacted for their willingness to participate in the study and time and venue for interview was arranged. Each participant that agreed to be interviewed was made to sign an informed consent form prior to participation and promised their complete anonymity. Each participant was interviewed separately.

Data collection tool and procedure with the objectives to find out if emergency nurses are adequately resourced to practice BLS and to establish the ease or difficulties with which they practice BLS, a semi-structured interview guide designed was used as the primary instrument for the face-to-face interviews. Six (6) interviews were conducted in English language at UCCH. All interviews were tape-recorded using open-ended questions in a conversational style. Field notes and memos were also taken in conjunction with the interviews to note observations, and casual encounters with participants. Ongoing data analysis took place throughout the study. All of the taped interviews, memos, and field notes were stored in a folder on the personal computer of the Principal Investigator (PI).

The data collection instrument had two (2) sections: (1) background information and (2) interview guide. The background information section collected data such as: gender, level of education, work place, years of practice as an emergency nurse, capacity of their emergency ward, if they had defibrillator(s) in the hospital and whether there is a defibrillator assigned solely to the emergency ward. The interview guide section asked questions such as: can you describe your experiences of working as an emergency nurse, have you encountered an event of cardiac arrest in practice?, do you have the full compliments to perform CPR in the emergency ward?, how do you assemble equipment during SCA event?, do you feel you would you have been happier working in another ward?, and is there anything you would like to add that has not been asked already?.

The data analysis took a conventional qualitative content analysis approach. In this

approach, coding categories are derived directly from the text data. It was data-driven and guided by conventional thematic analysis strategies identifying regular patterns of meaning both within and across the interviews, therefore allowing for identification of themes. The transcripts were repeatedly read by both authors to get an overall impression and to become familiar with the diversity of the data. The data analysis followed Sandelowski (2000) procedure, that are immersion in the data by reviewing and rereading all the interview transcripts, listening to the audio-recordings, and exploring the content and possible meanings of the data, breaking down and refining interview data into discrete codes, or units of meaning; and systematically comparing each coded element with all previously coded elements for similarities and differences.

The audio interviews recorded were transcribed using Microsoft Word and transferred to Microsoft Excel for analysis. Sentences and phrases were grouped, sorted and filtered using different colours. From here, the themes, categories, and subcategories emerged. The themes, categories, and subcategories therefore formed the basis for the discussion and appropriate summaries and conclusions made.

Transcription process are the PI conducted and transcribed all the audio-recorded interviews. This was very valuable as it allowed the author to stay close to the data. Being familiar with the emergency settings and BLS practices resolved the issue of third party transcription errors. To ensure accuracy, the transcription was done soon after each interview and were further reviewed by both authors. All identifying information were removed during the transcription process including names of participants and other people. Any reference to locations were removed as well. Extra steps were taken to protect the anonymity of the participants. Being both the interviewer and transcriber, the PI was able to include relevant nonverbal communication as he was present during the interview to witness it.

Member checking: a summary of the interviews was written following transcription, reviewed and sent to each participant as promised during the consent process. The participants were asked to review the summary and respond by asking either for changes to be made if there were inaccuracies or confirming if the summary was an accurate interpretation of their perspective. As asserted by Lincoln & Guba (1985), it adds to the credibility of the research by validating the accuracy of the findings of the interview, and it gives authority to the participant to confirm their perspective thus reducing interviewer bias. The summaries were reviewed and approved by the participants as originally written without any changes requested.

Researcher bias: while the experience of the PI as a practitioner involved in emergency care was a beneficial as an interviewer, negatively it created the opportunity for researcher bias. The researchers recognized that each participant was an expert of his/her own experience and what he/she believed must not come under influence by the researchers.

Rigour: to support the rigour of the study, Guba & Lincoln (1994) five criteria of trustworthiness: (a) credibility, (b) dependability, (c) confirmability, (d) transferability, and (e) authenticity was followed. **Credibility:** credibility or confidence in the truth of the findings was enhanced through investigator triangulation as all participants were asked the same questions. This challenged assumptions and ensured that the findings remained grounded in the participants' own experiences and that no data was lost. Again, to increase the validity of the research, all two investigators performed the analysis independently and the results were discussed to obtain consensus. **Dependability and confirmability:** were ensured through the construction of an audit trail, including raw data and memos from data collection and analysis that logged observations, impressions, reflections, process notes, and the basis of analytic decisions. **Transferability:** was enhanced through

description of the demographic profiles, context, and experiences of the participants. These rich depictions, and the inclusion of participant quotes in the findings, supported a fair and authentic presentation of the range of participants’ realities. **Authenticity:** this study used the authenticity criteria to reinforce the need to give a voice to the participants, to educate and improve understandings of personal constructions, and to stimulate and empower action through dissemination of findings.

## RESULTS

An important feature of QD is the recommendation to produce a final product that describes the participants’ experiences in a language similar to the participants’ own language (Neergaard, Olesen, Andersen, & Sondergaard, 2009). The objective of this study was to follow the QD method so it was important that the final product be recognizable to the participants and not transformed to another level of meaning.

This is characteristics of respondent. Respondent consist of four (4) of the participants were females whilst two (2) were males. Their educational levels were BSc (n=3) and Diploma (n=3). They have practiced for different number of years ranging from five (5) to twelve (12) years (average = 9.2 years). Of these years, they have practiced for varied number of years at the EW (average = 2.8 years) (Table 1).

**Table 1.** Participant characteristics

Participant	P1	P2	P3	P4	P5	P6
Gender	Female	Female	Male	Male	Female	Female
Level of Education	BSc	BSc	Diploma	BSc	Diploma	Diploma
Years of Practice (years)	9	12	8	5	10	11
Years of Practice as at the EW (years)	2	4	1	2	3	5

In the stage one of data aggregation and analysis, 17 first-level codes were extracted. After classifying and merging them, two (2) themes, five (5) categories and six (6) subcategories obtained (Table 2). These themes, categories and subcategories will therefore form the basis for discussion in this study.

**Table 2.** Themes Categories and Subcategories from the data

Themes	Categories	Subcategories
BLS equipment and material resources	Access to equipment Access to supplies and Emergency drugs	Procurement of drugs Consumables
Working environment and human resource	Crowding Job satisfaction Human resource	Outpatient consultation in the EW Attrition of trained staff

One of the major themes that emerged was BLS equipment and resources. This theme describes the participants’ description of equipment and material resources needed and availability for proper functioning of their emergency ward. Equipment and good material resources are essential for every emergency care situation. All of the participants described equipment availability as adequate. The EW has a trolley improvised as „crash cart“ though material resources (consumables and emergency drugs) are not readily

available. Some of the participants described the situation as:

*“...yes, we have, we have all the equipment: we have the ambubag, oxygen, drugs, tubes and defibrillator. All arranged on a trolley that we refer to as crash cart.”*

*“...equipment for CPR we have it, we have the whole things that we need to do the CPR.”*

*“...now we have gotten a trolley that we have arranged them, all the tubes, the mask, the ambubag, everything has been arranged and the emergency drugs that we have to give, some of them, not all the emergency drugs.”*

**Procurement of drugs and consumables:** although equipment and material resources seem not to be a problem for the provision of emergency services, the mode of access of consumables and emergency drugs is cumbersome. As participants<sup>1</sup> described the situation:

*“I suppose resources, consumables and things are not readily available.”*

Another participant describes the situation as:

*“...consumables have to be procured from pharmacy by the patient.”*

It did not look like that was the only hindrance they had with emergency drugs and supplies, as another participant said:

*“...consumables and emergency drugs sometimes have to be procured by patients or relatives from outside... I mean a pharmacy outside the hospital and sometimes it may take hours or even a whole day”*

Another participant described the situation as:

*“...and the emergency drugs that we have to give, some of them, not all the emergency drugs are available.”*

Again, another participant also described the situation as:

*“...my experience, (clears throat). It’s quite, errrrrm it’s quite challenging anyway, because most of the time, the available things to work with are not available, they are not there for you to work with, especially when it comes to the emergency drugs (pause)...the emergency drugs, we don’t have them, basic things that we need...”*

**Working Environment and Human Resource.** Another major theme that came up was working environment in connection with the ease or difficulties in the practice of BLS. This theme captured the participants<sup>2</sup> description of their working environment and human resource needed and whether it is conducive or otherwise to practice BLS. Describing the working environment, the participants described their working in the EW environment as stressful, but seem to enjoy their work.

**Crowding (Outpatient consultation in the EW):** according the participants, a consulting room attached to the EW affects their operations leading to crowding in the EW. The consulting room attends to patients who present at any time of the day when they should have attended outpatient clinic. Some of the participants expressed this as:

*“...and the number of patients that troupe into the EW most of them are not emergencies.”*

Another expression was:

*“they come there probably to dodge the waiting at the outpatient clinic”*

A participant summed the situation as:

*“crowding is a major problem in our EW, the area become so full – with patients who shouldn’t be there, and we have to attend to them as well.”*

**Human resources (Attrition of trained staff):** staffing was cited as a problem faced by practitioners at the EW, as they did not seem to have enough and the few the train are transferred out to other wards.

A participant described the situation as:

*“It’s the practices because we are just a few and it’s not everybody that is able to*

*help when there is cardiac arrest or when we have to do CPR, we don't have much hands"*

The situation was summed-up by a participant as:

*"...when staff are trained, they are transferred to another ward during the yearly staff changes. So we have to train the new staff we get"*

**Job satisfaction:** working in the EW did not seem too easy though they enjoyed their work.

A participant puts it as:

*"...working in the EW is exciting and hectic at the same time."*

Another described the environment as enjoyable:

*"...although it is hectic, I enjoy doing what I do so..."*

## **DISCUSSION**

This study sought to explore the preparedness and resourcefulness of emergency nurses related to BLS practices in the EW. It became apparent that equipment and human resources were not a hinder to BLS practices in the EW yet proximity of supplies especially emergency drugs and consumables were cited as problems. Again, some essential drugs and consumables have to be procured from the pharmacy (sometimes from outside the hospital) for use during emergencies. The Ministry of Health (MOH) of Ghana published a guidelines document for the establishment and running an emergency unit in Ghana (Ministry of Health, 2011). The guidelines explicitly state the minimum equipment requirement for an emergency unit and UCCH's EW appears meet the minimum requirements. Patients having to purchase drugs and consumables before receiving care is not acceptable as the MOH indicates that financial consideration should not be a barrier to the initial treatment of the patient in an emergency.

Though the EW does have an improvised emergency crash cart, the ideal emergency crash cart should be a wheeled chest of drawers that stores lifesaving equipment, drugs, or anything that will be required in the event of a medical emergency. It is extremely essential that cart is well- stocked with all the necessary drugs and equipment to ensure that the staff are able to manage emergencies conveniently. The emergency crash cart has a drawer for medications; an intravenous solutions drawer; a drawer each for adult and paediatric intubation; a drawer for intravenous and blood supplies; a drawer for oxygen delivery and tubing; and a drawer for miscellaneous items (UC Davis Health, 2021). In this study, the drugs and supplies did not pose a problem in BLS practice but arrangement and location within the EW is a problem. Again, the mode of acquisition of some essential emergency drugs especially from either the hospital's pharmacy or externally causes delays in care delivery at the EW.

Another theme that emerged from this study was the participants' description of their work environment as to whether it is conducive or otherwise to practice BLS. Though the participants enjoyed their work environment, overcrowding was identified as a problem in the EW. This crowding, according to them, is as a result of a consulting room attached to the EW. Crowding occurs, according to the American College of Emergency Physicians (ACEP), when the recognized need for emergency services exceeds available resources for patient care in the EW, hospital, or both (American College of Emergency Physicians (ACEP), 2019).

ACEP noted that crowding can cause several problems, including increased length of stay for admitted patients, decreased patient satisfaction for both hospitalized and EW patients, diminished EW staff satisfaction and employee engagement, significant delay in evaluation and treatment of emergency patients, and patients leaving prior to completion of medical treatment. When crowding occurs, patients are often placed in hallways and

other non-treatment areas to be monitored until EW treatment beds or staffed hospital inpatient beds become available. Additionally, a systematic review Stang et al. (2015) found an association between EW crowding measures and quality of care. It therefore becomes the responsibility of hospital leadership and care providers to quantifiably measure, analyze, and address identifiable and recurrent causes of crowding in order to prevent poor outcomes related to crowding. The ACEP recommends that hospital leadership utilize a crowding assessment tool to consistently quantify saturation events and analyze data to identify specific mitigation actions that involve the entire hospital. Furthermore, Abicho (2017) recommends that physical capacity of EW and hospital should be increased to contain the surge.

## CONCLUSION

This study explored emergency nurses' basic life support practices. While participants mentioned that they had difficulty in their practice, they enjoyed working in the EW. Due to the fact that patients attend to the EW without prior appointment and patients attending the emergency when they actually should have attended the out-patient clinic, staff gets overwhelmed with the surge each day. This study further sought to raise awareness of the importance of BLS preparedness among EW nurses, and hopefully, the results from this study will stimulate discussions and actions both at the micro (unit and hospital level) and macro levels of emergency care, that is, through education and conceptions of care. More work is needed in the area of emergency attendance and necessary policies established to control attendance to the EW.

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## REFERENCES

- Abicho, T. B. (2017). Causes of Overcrowding and NEDCOS Score at Resource Limited Setting: Experience from Ethiopian Tertiary Care Hospital Emergency Center. *Prehospital and Disaster Medicine*, 32(S1), S32–S33. <https://doi.org/10.1017/S1049023X17001030>
- Afaya, A., Bam, V., Azongo, T. B., Afaya, R. A., Yakong, V. N., Kpodo, G. K., Kaba, R. A., Nangsire Zinle, D. A., Tayuu, D. K., Asantewaa, S. & Adatar, P. (2021). "We are left with nothing to work with"; challenges of nurses working in the emergency unit at a secondary referral hospital: A descriptive qualitative study. *PLoS ONE*, 16(2 February), 1–12. <https://doi.org/10.1371/journal.pone.0247062>
- American College of Emergency Physicians (ACEP). (2019). Crowding. Dallas, TX: American College of Emergency Physicians.
- Atakro, C. A., Ninnoni, J. P., Adatar, P., Gross, J., & Agbavor, M. (2016). Qualitative Inquiry into Challenges Experienced by Registered General Nurses in the Emergency Department: A Study of Selected Hospitals in the Volta Region of Ghana. *Emergency Medicine International*, 1–7. <https://doi.org/10.1155/2016/6082105>
- Guba, E. G., & Lincoln, Y. S. (1994). Competing Paradigms in Qualitative Research. In N. K. Denzin & Y. S. Lincoln (Ed.), *Handbook of qualitative research* (pp. 105–

117). Thousand Oaks, CA: Sage.  
<https://doi.org/http://www.uncg.edu/hdf/facultystaff/Tudge/Guba%20&%20Lincoln%201994.pdf>

- Guetterman, T. C., Kellenberg, J. E., Krein, S. L., Harrod, M., Lehrich, J. L., Iwashyna, T. J., Kronick, S. L., Girotra, S., Chan, P. S., & Nallamothu, B. K. (2019). Nursing roles for in-hospital cardiac arrest response: higher versus lower performing hospitals. *BMJ Quality & Safety*, *28*(11), 916–924. <https://doi.org/10.1136/bmjqs-2019-009487>
- Kouwenhoven, W. B., Jude, J. R., & Knickerboker, G. G. (1960). Closed-chest cardiac massage. *JAMA*, *173*, 1064–1067. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/14411374>
- Lincoln, Y. S. & Guba, E. G. (1985). *Naturalistic inquiry*. Beverly Hills, CA: Sage.
- Neergaard, M. A., Olesen, F., Andersen, R. S., & Sondergaard, J. (2009). Qualitative description—the poor cousin of health research? *BMC Medical Research Methodology*, *9*(1), 1–5. <https://doi.org/10.1186/1471-2288-9-52>
- Peberdy, M. A., Kaye, W., Ornato, J. P., Larkin, G. L., Nadkarni, V., Mancini, M. E., ... Lane-Trullt, T. (2003). Cardiopulmonary resuscitation of adults in the hospital: A report of 14 720 cardiac arrests from the National Registry of Cardiopulmonary Resuscitation. *Resuscitation*, *58*(3), 297–308. [https://doi.org/10.1016/S0300-9572\(03\)00215-6](https://doi.org/10.1016/S0300-9572(03)00215-6)
- Perkins, G. D., Handley, A. J., Koster, R. W., Castréne, M., Smyth, M. A., Orlowski, T., Monsieurs, K. G., Raffay, V., Gräsner, J., Wenzel, V., Ristagno, G., & Soar, J. (2015). European Resuscitation Council Guidelines for Resuscitation 2015. Section 2. Adult basic life support and automated external defibrillation. *Resuscitation*, *95*, 81–99. <https://doi.org/10.1016/j.resuscitation.2015.07.015>
- Sandelowski, M. (2000). Focus on research method: Whatever happened to Qualitative Description. *Research in Nursing & Health*, *23*(3), 334–340. [https://doi.org/10.1002/1098-240X\(200008\)23:4<334::AID-NUR9>3.0.CO;2-G](https://doi.org/10.1002/1098-240X(200008)23:4<334::AID-NUR9>3.0.CO;2-G)
- Sandelowski, M. (2010). What “s” in a Name? Qualitative Description Revisited, (December 2009), 77–84. <https://doi.org/10.1002/nur.20362>
- Saramma, P. P., Suja, R. L., P. K. Dash, P. K., & Sarma, P. S. (2016). Assessment of Long-Term Impact of Formal Certified Cardiopulmonary Resuscitation Training Program among Nurses. *Indian Journal of Critical Care Medicine: Peer-Reviewed, Official Publication of Indian Society of Critical Care Medicine*, *20*(4), 226–232. <https://doi.org/10.4103/0972-5229.180043>
- Stang, A. S., Crotts, J., Johnson, D. W., Hartling, L., & Guttman, A. (2015). Crowding measures associated with the quality of emergency department care: A systematic review. *Academic Emergency Medicine*, *22*(6), 643–656. <https://doi.org/10.1111/acem.12682>

Tunstall-Pedoe, H., Bailey, L., Chamberlain, D. A., Marsden, A. K., Ward, M. E., Zideman, D. A. (1992). Survey of 3765 cardiopulmonary resuscitations in British hospitals (the BRESUS Study): methods and overall results. *BMJ*, 304(1347). <https://doi.org/http://www.bmj.com/content/304/6838/1347.pdf%2Bhtml>

UC Davis Health. (2021). Center for Professional Practice of Nursing Resources. Retrieved from [https://health.ucdavis.edu/cppn/resources/clinical\\_skills\\_refresher/crash\\_cart/](https://health.ucdavis.edu/cppn/resources/clinical_skills_refresher/crash_cart/)