WORKSHEET for Evidence-Based Review of Science for Emergency Cardiac Care

Worksheet author(s)

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Clinical question. "In adult and pediatric patients with cardiac arrest (prehospital [OHCA], in-hospital [IHCA]) (P), does existence and use of advanced directives (eg. "living wills" and "do not resuscitate" orders) (I) compared with no such directives (C), improve outcome (eg. appropriate resuscitation efforts) (O)?"

Is this question addressing an intervention/therapy, prognosis or diagnosis? intervention
State if this is a proposed new topic or revision of existing worksheet: new

Conflict of interest specific to this question

Do any of the authors listed above have conflict of interest disclosures relevant to this worksheet? Dr Schmidt is a member of the National POLST Taskforce and has worked with POLST in Oregon since its inception. She is the author of several manuscripts on the subject.

Jenny Dennett has no conflict of interest

Search strategy (including electronic databases searched).

Schmidt Search

1. U.S DHHS literature review on advance directives 6/07: http://aspe.hhs.gov/daltcp/reports/2007/advdirlr.htm
2. Medline search using term "advance directive", "cardiopulmonary resuscitation" "heart arrest" and years 2005-2009 done March 10, 2009, found 609 titles (This new search was only done for 2005 to present because the prior years were reviewed in the 2005 guidelines development and are used from search strategy 4 below) Updated May 25, 2009
3. Medline search as described in (2) was repeated August 9, 2009 for 2005 and prior. (1920 titles reviewed) No new articles added
4. Cochran review using terms "advance directive, do not resuscitate, DNR" done March 11, 2009 (none found)
5. Review of references from previous 2005 guidelines work sheet done April 4, 2009
6. Medline search using term "Do not resuscitate" and years 2005-2009 done April 14, 2009, found 173 titles
7. Embase search using term "advance directives" limits human and English years 2005-2009 done April 14, 2009 found 385 titles
8. Medline search for year 2009 repeated September 5, 2009. One new article added

Dennett search

Preliminary search conducted in June 2009.

Medline – "advance directives", "cardiac arrest", "cardiopulmonary arrest", "outcome", "living wills" "(do not resuscitate)', "resuscitation efforts" and "resuscitation" as text words searched individually, then all possible combinations of these words were searched for. Combinations were collated to 710 papers. Sorted to 42, after reading abstracts 7 papers selected, however none of them actually addressed the question above. Most were descriptive and none compared outcome with or without an advanced directive. One paper not available = 6.

August 2009

Embase - – "advance directives", "cardiac arrest", "cardiopulmonary arrest", "outcome", "living wills" "(do not resuscitate)', "resuscitation efforts" and "resuscitation" as text words searched individually, then all possible combinations of these words were searched for, combinations addressing "outcome" were also individually searched. Combinations were collated to 243 papers. Sorted to 64, duplicates removed, after reading abstracts 5 papers selected.

September 2009

AHA endnote database – Same search strategy as the Embase search conducted. Advanced directives – 3 papers, Advance directives and cardiac arrest and outcome – 169 papers. Cardiac arrest and outcome and resuscitation efforts – 29 papers. Living wills 18 papers.

Total papers to review 266. 46 Duplicates removed. 220 papers, abstracts read, 31 papers selected for review. After further review 13 papers seemed to have relevance to the question.

After searching references from the 13 papers one more paper found.

Total of 14 papers. All papers reviewed. Four papers answered the question (although mostly only in part).

• State inclusion and exclusion criteria

Inclusion:
Study with end point of whether or not an AD led to appropriate DNR orders
Survey or vignette of theoretical likelihood of AD affecting care
Study of outcome of appropriate resuscitation efforts

Exclusion

Studies whose outcome was unrelated to resuscitation (ie tube feedings, antibiotics or other interventions)
Studies of likelihood of completing an AD
Published conference proceedings, abstracts, editorials and letters
Descriptive papers and opinion papers were read and references searched but were excluded

• Number of articles/sources meeting criteria for further review: 4388 were found using the above search strategy but 33 were found that met the inclusion and exclusion criteria and are reported below

Summary of evidence

Evidence Supporting Clinical Question

Good				**E(Hammes and Rooney 1998; p.383)** **E(Tolle, Tilden et al. 1998;p.1097)** **E(Lee, Brummel-Smith et al. 2000;p.1219)** **E Skrifvars (2003; 65)** **E(Schmidt, Hickman et al. 2004; p.1430)** **E (Hickman et al 2009; p. 133)**	
Fair	**E Patrick (1995; S27)**	**E Johnson (1995;p107)**		**E(Dunn, Schmidt et al. 1996 p.785)** **E(Marco, Bessman et al. 2009; p.270)**	
Poor		**E(Sittisombut, Maxwell et al. 2008;p.37)**		**E(Lahn, Friedman et al. 2001;1158)**	
	1	**2**	**3**	**4**	**5**
Level of evidence					

A = Return of spontaneous circulation
B = Survival of event
C = Survival to hospital discharge
D = Intact neurological survival
E = Other endpoint
Italics = Animal studies

Evidence Neutral to Clinical question

Good					
Fair				**E(Partridge, Virk et al. 1998; p.589)** **E(Sahm, Will et al. 2005; p.437)**	
Poor				**E(Marco and Schears 2003; p.101)**	
	1	**2**	**3**	**4**	**5**
Level of evidence					

A = Return of spontaneous circulation
B = Survival of event
C = Survival to hospital discharge
D = Intact neurological survival
E = Other endpoint
Italics = Animal studies

Evidence Opposing Clinical Question

Good	**E(Teno, Licks et al. 1997; p.508) E(Teno, Lynn et al. 1997;p.500) E Schneiderman (1992; p 599)**	**E(Kish Wallace, Martin et al. 2001; p.2294) E(Mirarchi, Kalantzis et al. 2009; p.105)**	**E(Morrell, Brown et al. 2008; p.642)**		
Fair	**E(Teno, Stevens et al. 1998;p.439)**	**E(Dobbins 2007; p.50)**		**E(Mirarchi 2007; p. 299) E(Toller and Budge 2006; p.141) E(Danis, Southerland et al. 1991;p.882) E(Guru, Verbeek et al. 1999; p.1251) E(Lerner, Billittier et al. 2002; p.425) E(Becker, Yeargin et al. 2003; p. 303) E(Dull, Graves et al. 1994; p.997) E(Weinick, Wilcox et al. 2008; p. 179)**	
Poor				**E(Hardin and Yusufaly 2004; p. 1531) E (Corke et all 2009; p 122)**	
	1	**2**	**3**	**4**	**5**
Level of evidence					

A = Return of spontaneous circulation
B = Survival of event
C = Survival to hospital discharge
D = Intact neurological survival
E = Other endpoint
Italics = Animal studies

REVIEWER'S FINAL COMMENTS AND ASSESSMENT OF BENEFIT / RISK:

It is important to be clear about the definitions used in assessing this question. Advance directives (ADs) are documents that are completed by a patient when he or she has decision-making capacity that provide direction for care at a future time when the person has impaired decision-making capacity. They generally are of two types: the living will and the durable power of attorney for health care. The living will is a document that describes circumstances under which the person would want to limit treatment when incapacitated such as terminal illness, irreversible coma or severe suffering. The durable power of attorney appointments a person to make health care decisions when the patient cannot do so.

Do not attempt resuscitation (DNAR) orders and health care completed medical orders such as Physician Orders for Life Sustaining Treatment (POLST) forms are documents that are completed by health care professionals and are medical orders that apply at the current time. Unlike patient completed ADs, there is evidence that these orders are an effective means of honoring patient preferences to receive or withhold life sustaining treatments especially when they are part of a community system. Some authors use the term “advance directive” interchangeably for both types of documents described above. For the purposes of these recommendations they are not interchangeable. Some of the studies are limited by not clearly defining these terms.

Several studies suggest that the POLST form may be effective in conveying patient preferences for or against resuscitation (Dunn 1996; Lee 2000, Schmidt 2004, Tolle 1998, Hickman 2009). In the first study of portable medical orders (then called a Medical Treatment Coversheet), the authors used theoretical scenarios to determine whether or not 19 primary care physicians, 20 emergency physicians, 26 paramedics, and 22 long-term care nurses could correctly interpret the orders. Overall, providers were able to correctly identify treatments to provide or withhold. (Dunn 1996) A second study of 180 nursing home patients at one facility who had a POLST form indicting DNAR and comfort measures only were prospectively followed for 1 year. During that time, 38 died. The authors found that for these nursing home residents, 100% of the orders regarding CPR were honored. (Tolle 1998) This was a retrospective review in one PACE program. The charts of all patients (n=58) who died in a PACE program during one year were reviewed. All but one had a POLST form. The authors found that the form was generally effective in limiting unwanted interventions. Specifically, The POLST specified "do not attempt resuscitation" for 50 participants and CPR use was consistent with these instructions for 49 participants (91%). (Lee 2000) A study was also done to evaluate emergency medical technicians' (EMTs) experiences with the POLST program. A total of 572 EMTs responded. When present, POLST changed treatment in 45% of case and 93% of respondents agreed that the POLST form is useful in determining treatment when the patient is in cardiopulmonary arrest. Finally, a study of the use of POLST in 3 states surveyed 71 hospice programs that use POLST and did a chart review in 15 programs. Treatment limitations were respected in 98% of cases and no one received unwanted CPR.

Evidence also exists that ADs and other forms of DNAR orders can be effective as part of a community-wide program. A retrospective review of 540 decedents in one geographic area (LaCrosse, Wisconsin) after the implementation of program called Respecting Your Choices found 85% of decedents had ADs and almost all of these were in the medical record. A total of 271 documents indicated that CPR should not be attempted at some point and 90% stated that CPR should never be attempted. Treatment was withheld near the time of death in 98% of patients (528/540) usually consistent with the AD. It is noteworthy that this result is in the context of a community-wide education program about end-of-life planning. In a randomized controlled trial, Patrick (1995) studied 2558 older adults to determine the effectiveness and cost of preventive services for older adults including counseling to complete advanced directives. In a sub-study, charts of 200 participants were reviewed for evidence of serious medical events and resuscitation decisions. More living wills (65%) were noted for the treatment group than control group (47%) and participants in the treatment group were over twice as likely not to receive life-sustaining treatment.

A study of a community intervention was done in one hospital in Thailand. Terminally ill subjects admitted from April to Nov 2001 were designated controls and those from Dec 2001to May 2002 as the intervention group. Those in the second group received an intervention about ADs. After the intervention, 80/188 patient/surrogates completed an ADs and the number of patients receiving CPR dropped from 24/188 in the control group to 9/188 in the intervention group suggesting that ADs appeared to be effective in reducing futile CPR attempts. (Sittisombut 2008)

A Finnish study studied 1143 patients who died in four hospitals to ascertain the presence of ADs or DNAR orders and determined at 84.5% had a DNAR order. Living wills were uncommon (1.5%) but patients with a living will were likely to have a DNAR order so having one appeared to have had some impact on treatment. (Skrifvars 2003) Johnson (1995) evaluated the frequency with which ADs were available at the time of admission and their impact on subsequent care in an intensive care and ADs had little impact on the patterns of care or the utilization of resources, however a small subgroup was identified whose deaths were further analyzed. There were 92 people in this group, 16 of whom died. Five who did not have ADs died after unsuccessful CPR. Eleven had ADs and of these, five died in the ICU and three died in the hospital. They concluded that the presence of ADs did have potential for a meaningful effect on the medical care (resuscitation efforts) of patients (ie no CPR).

On the other hand, most of the studies of ADs do not support their effectiveness. Most noteworthy are reports from the SUPPORT Trial which enrolled a total of 9105 patients at five teaching hospitals in the United States and did not show that having an advance directive improved outcome. In the two years before implementation of the Patient Self Determination Act (PSDA) (1989-1991) SUPPORT collected prospective observational data on 4301 patients with advanced, serious disease. After the implementation of PSDA in Dec 1991 they collected data for two years on an additional 4804 patients. These patients were then randomized to receive either usual care (n=2152) or an intervention (n=2652) to enhance decision-making at the end of life. In the PRE group patients with and without advance directives had the same rate of DNR orders, even among those who stated that they wanted no resuscitation. Likewise, in the POST group, those with ADs and preferred to forego resuscitation had a DNR order in 585 of cases, just 4% more than those without ADs. Further, in a logistic regression model documentation of resuscitation preferences in the chart did in ADs having an impact on final resuscitation attempts before death. (Teno1997).

Studies since then, while less comprehensive, have not shown evidence of major changes. More recently in a descriptive study of all patients over 65 who died in one hospital a formal living will was found in 26.9% of the charts and a formal durable power of attorney for health care was found in 20.6% of cases. No relationship was found between the presence of an AD and use of life sustaining treatments. (Dobbins 2007) In a case control design of patients with cancer who were admitted to an ICU from 1994 to 1996 twenty seven percent had advance directives. There was no difference found in the likelihood having various life supporting treatments including cardiopulmonary resuscitation in those with and those without ADs. (Kish-Wallace 2001) Morrell (2008) reviewed all adult patients who died at a tertiary care hospital in 2005 (n=285). Twenty two percent of patients had an AD in their chart but there was no significant association between having an AD and having a DNAR order written.

Schneiderman (1992) conducted a randomized controlled trial with a sample group of 204 patients with life threatening illnesses. The experimental group were offered an AD, the control were not. No significant differences were found between the control and experimental group regarding the frequency of CPR, the type of interventions and there was not a statistical significant difference for the presence of Do Not Attempt Resuscitation (DNAR) orders. In fact the reverse was true (not statistically significant), the AD group spent more days in hospital and the control group was more likely to end up with a DNR order. Lerner (2002) surveyed primary care physicians in a northeastern county. Twenty-five percent reported resuscitation had been attempted for at least one patient with a nursing home DNAR order, suggesting that these orders were frequently not followed.

The two articles by Mirarchi are also important because they raise concerns that advance directives may actually be misinterpreted so that patients do not receive life-sustaining treatments when they would want them (Mirarchi 2007 and Mirachi 2009) In a case series of 3 patients with living wills, patients had a living will that indicted that he or she would not want to be resuscitated if incapacitated. The person then went to the hospital and presented for emergent care and someone misinterpreted the AD as indicating that the patient was DNAR when, at the time, the patient was not incapacitated. (Mirarchi 2007) In a subsequent study, the authors used scenarios with paramedics. They found that with standard living wills paramedics frequently misinterpreted the code status of patients and would potentially delay or with hold lifesaving care. (Mirarchi 2009) Danis (1991) analyzed 96 outcome events and found care was consistent with previously expressed wishes 75 percent of the time. The presence of an AD did not facilitate consistency. Among the 24 events in which inconsistencies occurred, care was provided more aggressively than had been requested in 6 cases and less aggressively than requested in 18, largely because hospitalization or cardiopulmonary resuscitation was withheld. While most of the studies of ADs raise concerns about their ineffectiveness because of over treatment, these raise concerns about under treatment.

Several studies offer insights about physician decision-making. In a survey of Australian intensive care doctors, using a hypothetical clinical scenario, to evaluate how potential end-of-life treatment decisions might be influenced by advance planning many intensive care doctors believe end-of life decisions remain medical decisions, and ADs need only be respected when they accord with the doctor's treatment decision. (Corke 2009) In another study, internists appeared to consider other factors such as prognosis, perceived quality of life, and the wishes of family or friends as more determinative than the directive. (Hardin 2004) A vignette-based study administered at palliative medicine, oncology, general practice, and geriatric medicine specialist trainees in the United Kingdom found that most trainees chose a level of care different from that in the AD. Confusion exists among doctors about the legal status of advance directives, which limits their usefulness. (Toller 2008)

Another problem with ADs is that they are often not available when most needed. In the Marco study, on the other hand, emergency physicians did report on a survey that they use advance directives. (Marco 2009) However, despite a decade of legislation promoting their use, ADs are lacking in most skilled nursing facilities residents transferred to EDs for evaluation. (Lahn 2001) In addition for EMTs most providers would honor a state-approved DNAR form but not patient's ADs or living wills. (Marco 2003) A retrospective medical record review and qualitative interviews with emergency department clinician in a study population of nursing home patients over age 65 transferred to the ED found that many patients arrived in the ED without their ADs and when it is sent it may not agree with other information in the record, limiting its use. (Weinick 2008)

A good summary of the data can be found in the U.S Department of Health and Human Services Literature Review on Advance Directives, “Generally, the research suggests that even when ADs are executed, physicians are frequently unaware of them, ADs are not easily available to surrogates when needed, ADs are too general and/or are inapplicable to clinical circumstances, and/or are invoked too late in the dying process or are at times overridden by providers and families.”(Wilkinson, Wenger et al. 2007)

Citation List

Becker, L. J., K. Yeargin, et al. (2003). "Resuscitation of residents with do not resuscitate orders in long-term care facilities." Prehosp Emerg Care **7**(3): 303-6.

Comment: This is a retrospective chart review and associated survey in one area: King County, Washington. It highlights the scope of the problem. 35% of residents in long term care facilities that suffered a cardiac arrest and for whom 911 was called had a DNR order. Of those, 21% had an attempted resuscitation, usually because of uncertainty about the validity of the forms. The study is limited by being in only one locale. It also only considered patients for which 911 was called. It does not illustrate that patients with DNR orders are still having attempts at resuscitation. It is also limited by being done before 2003. Since this study Washington state has begun to use POLST and many of the EMS systems have updated their protocols for withholding resuscitation LEVEL 4, quality fair (opposing)

Corke, C., S. Milnes, et al. (2009). "The influence of medical enduring power of attorney and advance directives on decision-making by Australian intensive care doctors." Crit Care Resusc **11**(2): 122-8.

Comment: This is a survey of intensive care 275 doctors in Australia with a poor response rate of 18%. It did not directly assess whether resuscitation decisions were honored but found that allow ADs had some influence on treatment decisions the physicians believed that they "only need to be respected when they accord with the doctor's treatment decision". Level 4, poor (opposed)

Danis, M., L. I. Southerland, et al. (1991). "A prospective study of advance directives for life-sustaining care." N Engl J Med **324**(13): 882-8.

Comment: This study is relatively old (1991). It is limited by being only one facility and one hospital but is consistent with other studies showing that advance directives are often not followed. Level 4, fair (opposing)

Dobbins, E. H. (2007). "End-of-life decisions: influence of advance directives on patient care." J Gerontol Nurs **33**(10): 50-6.

Comment: Descriptive study of all patients over 65 who died in one hospital (n=160). A formal living will was found in 26.9% of the charts and a formal durable power of attorney for health care (DPOA-HC) was found in 20.6% of cases. No relationship was found between the presence of an advance directive and use of life sustaining treatments. Only 7.5% of the patients received CPR at the end of their lives. No patients with living wills in their medical records received CPR. No such relationship was found between a formal or informal DPOA-HC and use of CPR. Level 2 fair (opposing)

Dull, S. M., J. R. Graves, et al. (1994). "Expected death and unwanted resuscitation in the prehospital setting." Ann Emerg Med **23**(5): 997-1002.

Comment: This study addresses the scope of the problem. This is a retrospective study and therefore some data points about chronic illness may not be accurately represented and may underestimate the problem. At the time of the study state law required attempted resuscitation whenever 911 was called. The authors found that 7% of attempts were unwanted. The study did not specifically address advance directives and this EMS system has since changed Level 4, fair (opposing)

Dunn, P. M., T. A. Schmidt, et al. (1996). "A method to communicate patient preferences about medically indicated life-sustaining treatment in the out-of-hospital setting." J Am Geriatr Soc **44**(7): 785-91.

Comment: This is the first of several studies on the Oregon POLST program which has since become a national model for portable physicians orders for life sustaining treatment. POLST orders are distinct from advance directives. Advance directives are completed by patients expressing preferences in the future while POLST orders are written by physicians and are applied at the current time. In this study, the authors used theoretical scenarios to determine whether or not 19 primary care physicians, 20 emergency physicians, 26 paramedics, and 22 long-term care nurses could correctly interpret the orders. Overall, providers were able to correctly identify treatments to provide or withhold. Level 4, fair (supporting)

Guru, V., P. R. Verbeek, et al. (1999). "Response of paramedics to terminally ill patients with cardiac arrest: an ethical dilemma." CMAJ **161**(10): 1251-4.

Comment: This was a retrospective chart review from November 1996 to August 1997 in the Toronto EMS system and like several others, may be limited by the date. The inclusion criteria specified clearly documented descriptors such as "terminally ill", "expected to die" and "terminal cancer". The presence of a DNR request was defined by a descriptor such as "DNR requested", "family requests

no resuscitation" or "family refuses CPR". The study found that 9.4% of patients with cardiac arrest had a terminal illness documented and 62% of these had a DNR order (70% of these were verbal and 30%). At the time of the study regulations required CPR in all cases. It found that DNR orders did not decrease the likelihood that CPR would be started but did decrease the likelihood of getting ALS treatment. Level 4, fair (opposing)

Hammes, B. J. and B. L. Rooney (1998). "Death and end-of-life planning in one midwestern community." Arch Intern Med **158**(4): 383-90.

Comment: This is a retrospective review of 540 decedents in one geographic area (LaCrosse, Wisconsin) after the implementation of program called Respecting Your Choices. One aim of the study was to determine the consistency between an advance directive and decisions made at the end of life. 85% of decedents had ADs and almost all of these were in the medical record. A total of 271 documents indicated that CPR should not be attempted at some point and 90% stated that CPR should never be attempted. Treatment was withheld near the time of death in 98% of patients (528/540) usually consistent with the AD. Decedents who did not have an AD were more likely to get CPR. It is noted that in this study the prevalence of forgoing treatment is so high in the whole population that it is not clear to what extent a shift in social and medical expectations is determining behavior rather than the ADs. It is noteworthy that this result is in the context of a community-wide education program about end-of-life planning. Also of note, this is an area that now uses POLST extensively but this study was based on patient-completed ADs. Level 4, good (supporting)

Hardin, S. B. and Y. A. Yusufaly (2004). "Difficult end-of-life treatment decisions: do other factors trump advance directives?" Arch Intern Med **164**(14): 1531-3.

Comment: This was a mailed survey of a convenience sample of residents and faculty at one institution (Loma Linda University, Department of Internal Medicine). The response rate was 47%. A limitations of the study are that it did not specifically address resuscitation but rather treatment decisions about dialysis, it was a convenience sample and only a fair response rate. The study found that internists would frequently make treatment decisions not consistent with advance directives. Level 4, poor (opposing)

Hickman, S. E., C. A. Nelson, et al. (2009). "Use of the Physician Orders for Life-Sustaining Treatment (POLST) paradigm program in the hospice setting." J Palliat Med **12**(2): 133-41.

Comment: This is a study of the use of POLST in 3 states. It was a survey of 71 hospice programs that use POLST and a chart review in 15 programs. The respondents reported that treatment limitations were respected in 98% of cases and no one received unwanted CPR. Level 4, good (supportive, POLST)

Johnson, R. F., Jr., T. Baranowski-Birkmeier, et al. (1995). "Advance directives in the medical intensive care unit of a community teaching hospital." Chest **107**(3): 752-6.

Level 2 Supportive. Fair. Prospective non randomized cohort. Old study, did not address the question fully. Only a small subgroup was identified in whom the presence of advanced directives meant that they did not receive cardiopulmonary resuscitation.

Kish Wallace, S., C. G. Martin, et al. (2001). "Influence of an advance directive on the initiation of life support technology in critically ill cancer patients." Crit Care Med **29**(12): 2294-8.

Comment: Case control design who were admitted to an ICU from 1994 to 1996. Twenty seven percent had advance directives. There was no difference found in the likelihood having various life supporting treatments including cardiopulmonary resuscitation in those with and those without advance directives. Level 2, good (opposing)

Lahn, M., B. Friedman, et al. (2001). "Advance directives in skilled nursing facility residents transferred to emergency departments." Acad Emerg Med **8**(12): 1158-62.

Comment: Observational study in two academic health centers. This study assessed patients transferred from a SNF to two EDs. It is important to note that any patient who was not transferred because of an advance directive would not be captured, so the study likely underestimates the number of patients who had ADs.All patients who were transferred from a SNF, inpatient hospice or other inpatient long term care facility during 96 twelve hour shifts were included. 44% had an AD and 64% of these included a DNR order. Only one of the 10 patients with an indication for CPR in the emergency department had an AD, It was found to be useful in that one case. Thus, this study is limited by its sample size of one! Level 4, poor (supporting)

Lee, M. A., K. Brummel-Smith, et al. (2000). "Physician orders for life-sustaining treatment (POLST): outcomes in a PACE program. Program of All-Inclusive Care for the Elderly." J Am Geriatr Soc **48**(10): 1219-25.

Comment: This is another of the studies of the Oregon POLST form. This was a retrospective review in one PACE program. The charts of all patients (n=58) who died in the program during one year were reviewed.All but one had a POLST form. The authors found that the form was generally effective in limiting unwanted interventions. Specifically, The POLST specified "do not resuscitate" for 50 participants and CPR use was consistent with these instructions for 49 participants (91%). Level 4 good (supporting for POLST)

Lerner, E. B., A. J. Billittier, et al. (2002). "Out-of-hospital do-not-resuscitate orders by primary care physicians." J Emerg Med **23**(4): 425-8.

Comment: This was a mailed survey of primary care physicians in a northeastern county. Response rate was fair at 42%. Twenty-five percent reported resuscitation had been attempted for at least one patient with a NH-DNR order, suggesting that these orders are frequently not followed. In addition, the study found that there was a lack of clarity about whether or not DNR orders apply to intubation and other life sustaining treatments when the patient is not in cardiac arrest. Level 4. fair (opposed)

Marco, C. A., E. S. Bessman, et al. (2009). "Ethical issues of cardiopulmonary resuscitation: comparison of emergency physician practices from 1995 to 2007." Acad Emerg Med **16**(3): 270-3.

Comment: Anonymous survey of a random sample of emergency physicians who were members of a national organization. Response rate was poor at 18% but with a fairly large sample size of 928. These physicians reported that they use written advance directives. The study is limited by the poor response rate and that it is reported rather than actual actions. Level 4, fair (supporting)

Marco, C. A. and R. M. Schears (2003). "Prehospital resuscitation practices: a survey of prehospital providers." J Emerg Med **24**(1): 101-6.

Comment: This was a national survey of EMS providers with a 41% response rate. It found that most providers would honor an official state-approved advance directive (really a state-approved DNR form) but not "unofficial documents (such as patient's ADs or living wills). It was rated as poor because it did not directly address the question of patient completed ADs. Level 4, poor (neutral)

Mirarchi, F. L. (2007). "Does a living will equal a DNR? Are living wills compromising patient safety?" J Emerg Med **33**(3): 299-305.

Comment: This is a case series of 3 patients with living wills. In each of the cases, the patient had a living will that indicted that he or she would not want to be resuscitated if incapacitated. The person then went to the hospital and presented for emergent care and someone misinterpreted the advance directive as indicating that the patient was DNR when, at the time, the patient was not incapacitated. The authors raise concerns about this misunderstanding. While most of the studies of ADs raise concerns about their ineffectiveness because of over treatment, this one and the next raise concerns about under treatment. Level 4, fair (opposing)

Mirarchi, F. L., S. Kalantzis, et al. (2009). "TRIAD II: do living wills have an impact on pre-hospital lifesaving care?" J Emerg Med **36**(2): 105-15.

Comment: This is the second article about this author raising concerns about the interpretation of living wills. In this study, they used scenarios with paramedics at an inservice. They found that with standard living wills paramedics frequently misinterpreted the code status of patients and would potentially delay or with hold lifesaving care. This is the second article that raises a concern about under treatment. It is a single setting and may not be generalizable. Level 2, good (opposing)

Morrell, E. D., B. P. Brown, et al. (2008). "The do-not-resuscitate order: associations with advance directives, physician specialty and documentation of discussion 15 years after the Patient Self-Determination Act." J Med Ethics **34**(9): 642-7.

Comment: This was a retrospective study at on tertiary care hospital of all adult patients who died in 2005 (n=285). 22% of patients had an advance directive in their chart. The authors found that there was no significant association between having an advance directive and having a DNR order written during the terminal admission. This study was limited by not separating out the type of advance directive (they note that the most common was a living will but many were an appointed health care representative). Like most of the studies, it was also only one institution. Level 4, good (opposing)

Partridge, R. A., A. Virk, et al. (1998). "Field experience with prehospital advance directives." Ann Emerg Med **32**(5): 589-93.

Comment: This was a survey of one ambulance service with a good response rate of 78%. It is from 1998. It defined DNR orders as advance directives and did not specify the difference between physician orders and patient ADs. They found that 78% considered these orders when making treatment decisions, noting that this means that a sizable portion do not. Level 4 fair (neutral)

Patrick, D. L., S. A. Beresford, et al. (1995). "Interpreting excess mortality in a prevention trial for older adults." Int J Epidemiol **24 Suppl 1**: S27-33.

Level 1 Supportive. Fair. Old study. This was a substudy examining the excess deaths in the intervention group. Conclusion that excess deaths in the treatment group were due to the uptake of advanced directives. An extrapolation of this conclusion is that advanced directives reduced resuscitation efforts in patients, however further extrapolation to an improvement in resuscitation outcomes was not addressed.

Sahm, S., R. Will, et al. (2005). "Attitudes towards and barriers to writing advance directives amongst cancer patients, healthy controls, and medical staff." J Med Ethics **31**(8): 437-40.

Comment: This was a structured questionaire of patients and health care providers about advance directives. It is included because it surveyed a sample outside the United States. Level 4, fair (neutral)

Schmidt, T. A., S. E. Hickman, et al. (2004). "The Physician Orders for Life-Sustaining Treatment program: Oregon emergency medical technicians' practical experiences and attitudes." J Am Geriatr Soc **52**(9): 1430-4.

Comment: Please note that I am the author of this study. It is one of the studies evaluating the Oregon POLST program. S stratified, random sample of EMTs in Oregon was studied. The response rate was good. 93% of respondents thought the POLST form was useful when making decisions about patients who were in cardiac arrest and they reported that 45% of the cases where the form was available it changed their care. The study did not specifically address if the form was correctly interpreted. Level 4, good (supporting, POLST)

Schneiderman, L. J., R. Kronick, et al. (1992). "Effects of offering advance directives on medical treatments and costs." Ann Intern Med **117**(7): 599-606.

Level 1. Good. Opposing. Randomised Control Trial. Sample size a little small with only 69 in the experimental group. Over a number of variables including medical treatments (DNR orders, rates of CPR) there was no statistical difference between those who had an advanced directive and those who did not

Sittisombut, S., C. Maxwell, et al. (2008). "Effectiveness of advance directives for the care of terminally ill patients in Chiang Mai University Hospital, Thailand." Nurs Health Sci **10**(1): 37-42.

Comment: This is a study done at one hospital in Thailand. The methods are described as, "a quasi-experimental design comparing patients allotted to the intervention group with those in the non-randomized control group". Actually, terminally ill subjects admitted from April to Nov 2001 were designated controls and those from Dec 2001to May 2002 as the intervention group (a "before and after" design"). Those in the second group received an intervention about advance directives. The authors found that after the intervention, 80/188 patient/surrogates completed an AD. The authors found that the number of patients receiving CPR dropped 24/188 in the control group to 9/188 in the intervention group and they suggest that ADs appear to be effective in reducing futile CPR attempts. There are many limitations to this study since there were a number of policy and other changes during the study. Level 2 poor (supporting)

Skrifvars, M. B., H. M. Hilden, et al. (2003). "Prevalence of 'do not attempt resuscitation' orders and living wills among patients suffering cardiac arrest in four secondary hospitals." Resuscitation **58**(1): 65-71.

Level 4. Supportive. Good. More recent study. 1143 patients who died in four Finnish hospitals. 84.5% had a DNAR order and were not resuscitated. 204 patients who did not have a DNAR order were resuscitated, their overall survival or outcome was not addressed. A subsection of this group (18 patients) had an un witnessed arrest. None of these patients survived to hospital discharge. The patients who had a DNAR order were older and were

Teno, J., J. Lynn, et al. (1997). "Advance directives for seriously ill hospitalized patients: effectiveness with the patient self-determination act and the SUPPORT intervention. SUPPORT Investigators. Study to Understand Prognoses and Preferences for Outcomes and Risks of Treatment." J Am Geriatr Soc **45**(4): 500-7.

Comment: This is one of a series of articles reporting on the SUPPORT Trial. SUPPORT is the largest and best designed study of an intervention to improve end-of-life care and provides the strongest evidence against the effectiveness of ADs. This report is on an observational study. In the two years before implementation of the Patient Self Determination Act (PSDA) (1989-1991) SUPPORT collected prospective observational data on 4301 patients with advanced, serious disease. After the implementation of PSDA in Dec 1991 they collected data for two years on an additional 4804 patients. These patients were then randomized to receive either usual care (n=2152) or an intervention (n=2652) to enhance decision-making at the end of life. In the PRE group patients with and without advance directives had the same rate of DNR orders, even among those who stated that they wanted no resuscitation. Likewise, in the POST group, those with ADs and preferred to forego resuscitation had a DNR order in 585 of cases, just 4% more than those without ADs. Further, in a logistic regression model documentation of resuscitation preferences in the chart did in ADs having an impact on final resuscitation attempts before death. This study would be limited by its date of the early 1990s except that there is little evidence of change since then. Level 1, good (opposing)

Teno, J. M., S. Licks, et al. (1997). "Do advance directives provide instructions that direct care? SUPPORT Investigators. Study to Understand Prognoses and Preferences for Outcomes and Risks of Treatment." J Am Geriatr Soc **45**(4): 508-12.

Comment: This is the second of the reports cited from the SUPPORT Trial. In this study, the authors reviewed the content of the advance directives of 569 patients. 22 subjects stated clearly a preference to forego life-sustaining treatment in their current state of health. Care was consistent in 11 cases. As the authors note, "In 4804 patients, only 90 had a directive that gave specific instruction, only 36 of these aimed to direct life-sustaining care and only 22 of these noted preferences to forego care in the patient's current medical circumstances. Even if all of these had been noted and rigorously followed, the effects upon the overall population would have been imperceptible." Level 1, good (opposing)

Teno, J. M., M. Stevens, et al. (1998). "Role of written advance directives in decision making: insights from qualitative and quantitative data." J Gen Intern Med **13**(7): 439-46.

Comment: This is another of the SUPPORT studies. This article reports on a mixed qualitative and quantitative analysis of 14 patients with a written advance directive who were either comatose, had a prognosis of less than 2 months or died during the hospitalization. The goal was to understand the role ADs had on medical decision making. They found that ADs played a role in decision making in 5/14 cases. The limited role for ADs had multiple explanations including not recognizing that the patient was "hopelessly ill" and the vague content of the documents. Level 1, fair (opposing)

Tolle, S. W., V. P. Tilden, et al. (1998). "A prospective study of the efficacy of the physician order form for life-sustaining treatment." J Am Geriatr Soc **46**(9): 1097-102.

Comment: This is one of the studies on POLST. 180 nursing home patients at one facility who had a POLST form indicting DNR and comfort measures only were prospectively followed for 1 year. During that time, 38 died. The authors found that for these nursing home residents, 100% of the orders regarding CPR were honored. Level 4, good (supporting, POLST)

Toller, C. A. and M. M. Budge (2006). "Compliance with and understanding of advance directives among trainee doctors in the United Kingdom." J Palliat Care **22**(3): 141-6.

Comment: This is a study from the UK using vignettes of a patient with and without an advance directive. Respondents were trainees. In these vignettes, trainees often chose a level of care different from that in the AD. Level 4, fair (opposed)

Weinick, R. M., S. R. Wilcox, et al. (2008). "Use of advance directives for nursing home residents in the emergency department." Am J Hosp Palliat Care **25**(3): 179-83.

Comment: This study included a retrospective medical record review and qualitative interviews with emergency department clinicians. The study population was nursing home patients over age 65 transferred to the ED and then admitted to one hospital from Nov 2004 May 2005. 50 patients were randomly selected from this population. A convenience sample of 10 ED clinicians was interviewed. The authors found that many patients arrived in the ED without their ADs and when it is sent it may not agree with other information in the record, limiting its use. Level 4, fair (opposed)

Wilkinson, A., N. Wenger, et al. (2007). Literature Review on Advance Directives, U.S. Department of Health and Human Services**:** http://aspe.hhs.gov/daltcp/reports/2007/advdirlr.htm.

Comment: This is not a specific study, but a review of the literature on ADs which was published in June 2007.