Evidence Profile

Recommendation question 1: **Should providing education to persons and their families about their vascular access device be recommended?**

Recommendation 1.1: The expert panel recommends that health providers provide comprehensive health teaching to persons and their families about their vascular access device.

Population: Persons and their families
Intervention: Comprehensive education about vascular access devices (e.g., reason for the device, assessing for infection, what to do if infection is suspected, maintenance of the device)
Comparison: Standard care [may include basic education]
Outcomes: Dwell time [Not found in this literature], Completion of therapy (i.e., number of persons who make it to the end of therapy with the device) [Not found in this literature], Hospital re-admission rate and Complications (i.e., phlebitis, infiltration, extravasation, infection, bleeding, embolism)

Setting: All health care settings where a VAD may be used.

Bibliography: 659, 769, 1195, 1470, 2060, 12842, 573, 987, 6526

Quality assessment							Study details		No. of participants		Reported effects/outcomes	Certainty	Reference
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Publication bias	Country	Intervention	Intervention	Control			
Complications (Measurements: *infection rate, alteplase use or need for line to be replaced, chart review of central line associated blood stream infection (CLABSI), frequency of PICC/CVAD occlusions and infections, incidence of catheter-related complications via EMR*)													
1	Randomized Controlled Trial	Very serious[a]	Not serious	Not serious	Very serious[b]	Not detected	**573**: USA	**573:** The experimental group participants received the DVD and standard CVAD education in homecare management and caregiver demonstrated proficiency, as measured by the RN teaching checklist. Approximate time for the intervention education was 80 minutes (i.e., 20-minute DVD and 60-minute face-to-face nurse education). Control: The control group participants received the standard 60-minute CVAD face-to-face education from frontline pediatric oncology nurses. After completing all study questionnaires, the control group participants were given the DVD to ethically provide the education to all patients	**573** N=33 Infection: 11 Alteplase use: 13 Line replaced in operating room: 7	**573** N=21 Infection: 6 Alteplase use; 14 Line replaced in operating room: 4	**573:** Clotting (as demonstrated by alteplase use) was lower in the intervention group than the control group. Summary of effect: For every 100 people who receive education, 13 less people will have complications (ranges from 44 less to 1 less). There was no difference between groups for other complications.	⊕◯◯◯ Very Low	**573:** Raybin et al., 2019
7	Quasi-experimental	Very Serious[c]	Not serious	Not serious[d]	Serious[e]	Not detected	**659:** USA	**659**: *Caregiver Central Line Care Curriculum:* When a patient was admitted to hospital: a) nurse educator worked with a minimum of 1 family member – taught aseptic CVAD basics (e.g., properly	**659**: N = 80 (2009-2014) *Community acquired*	**659:** N = 45 (2005-2007) *Community*	Most studies reported a decrease in complications in persons who received health teaching, when compared to either baseline or control groups. **659:** CLABSI rate decreased from 7 per 1000 central line days prior to curriculum implementation to 2.9 per 1000 central line days after curriculum implementation.	⊕◯◯◯ Very Low	**659:** Drews et al., 2017

Quality assessment							Study details		No. of participants		Reported effects/outcomes	Certainty	Reference
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Publication bias	Country	Intervention	Intervention	Control			
								flush catheter, dressing and cap changes, TPN prep), and daily and emergency care; b) the caregiver had to complete a competency checklist over 4 days; c) before the patient was discharged home, the caregiver was required to "room in" and provide total care for 24 hours to demonstrate their competency; d) A DVD outlining the central line care teachings was given to family members. Prior to curriculum implementation intervention: no formalized caregiver education.	*CLABSI rate:* 4.8 per 1000 CVAD days (2009) to 2.9 per 1000 CVAD days (2014)	*acquired CLABSI rate:* 7 per 1000 CVAD days			
							769: USA	**769:** *Comprehensive Educational Intervention / PICC Self-Care Education Intervention:* a) face to face meeting between patient and infusion nurse (either in home or outpatient infusion center); b) coaching via FaceTime; c) while on FaceTime and supervised by nurse, patients and/or caregivers flushed their PICC lines; d) participants were given access to a YouTube video that outlined the 10 steps to flushing; e) participants had to return to the infusion center at least once a week to be examined for signs of PICC occlusion/infection. *Standard:* Infusion nurse demonstrates to the patient/caregiver how to flush a PICC. Patient is provided with a printed handout that outlines the steps.	**769:** N = 10 patients *Infection:* 1/10 (9.1%) developed thrombophlebitis *Occlusion:* 0/10	**769:** National average of PICC occlusions: 14 to 36%	**769:** Patients who participated and completed the Self-Care Education Intervention for PICC care lower number of occlusion rate compared to the national average (no occlusions compared to a rate of 14-36%).		**769:** Petroulias, 2017
							1195: Korea	**1195:** Intervention: *CVAD Self-Management Education Program:* 4 50-minute face-to-face sessions during a person's hospital admission using a combination of didactic and written information. a) Patients express experiences with CVAD insertion and learn of their use and function; b) 7-10 days of hospitalization and after chemotherapy, patients have opportunity to observe insertion of CVAD using a model, and participate in 30 min education session	**1195:** N = 21 *CVAD-Related Complications* (1 infection, 3 occlusion): 4/21 = 19% *Rate of infection:* 0.62	**1195:** N = 24 *CVAD-Related Complications* (3 infection, 8 occlusion, 1 damage): 12/24 = 50%	**1195:** There were fewer complications in the intervention group (RR 0.38 95% CI 0.14-1.00). For every 100 people who receive education, 31 less people will PICC-related complications (ranges from 43 less to 0 [no difference]).		**1195:** Park (2016)

Quality assessment							Study details		No. of participants		Reported effects/outcomes	Certainty	Reference
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Publication bias	Country	Intervention	Intervention	Control			
								on CVAD self-management tasks they could practice at home; c) In the second or third week of hospitalization, patients are shown aseptic technique, how to dress the CVAD site and use the heparin solution to flush the line (using a model). Patients have the opportunity to practice the skills under the supervision of the instructor. Cases of complications are also shared; d) on day before discharge, patients evaluated on how well they can perform the self-management tasks and provided feedback. Re-education is provided if necessary. Control: *Usual Care* – 30 minute group education on CVADs	per 1000 catheter days *Rate of occlusion:* 1.87 per 1000 catheter days	*Rate of infection:* 1.63 per 1000 catheter days *Rate of occlusion:* 4.45 per 1000 catheter days			
							1470: Italy **2060:** Taiwan	**1470:** Intervention: *Caregiver Training:* 9 sessions each lasting 60-90 minutes over approximately 2 months. Each session was attended by 1-2 caregivers. a) overview of infection prevention measures and CVAD care; b) individual and environmental hygiene measures; c) hands-on demonstration and practice of CVAD care on mannequin and discussion of barriers and risks at home; d) hands-on session on patient, overview of checklist for CVAD management, question and answer period. Control: Caregivers received general information about CVADs and their management. **2060:** Intervention: After the CVAD was inserted, caregivers watched a 10 min educational video about CLABSI prevention guidelines, received 20 min of individual training whereby they discussed the goals of assisting the patient, how they can help prevent CLABSI, the challenges of caregiving	**1470:** CLABSI rate over first 8 mths of intervention: 3.70/1000 CVAD days If caregiver was fully trained: CLABSI rate: 1.74/1000 CVAD days (95% CI: 0.43 to 6.94) VS. not trained: 12.2/1000 CVAD days (95% CI: 7.08 to 21.0) VS. in training: 3.96/1000 CVAD days (95%CI: 1.98 to 7.91) **2060:** 32 patients ad 32 caregivers	**1470:** Baseline CLABSI rate (12 mths before interventio n): 6.86/1000 CVAD days **2060:** 30 patients and 30 caregivers *Incidence*	**1470:** After implementation of the training, there was a 46.1% reduction in the CLABSI rate attributable to the intervention alone. Moreover, there was a lower rate of CLABSI when caregivers were fully trained compared to caregivers who were not trained at the time their child was diagnosed with a CLABSI (P<0.05). **2060:** There was no incidence of infection across all patients in either intervention or control groups after 8 days of CVAD being in situ.		**1470:** LoVecchio et al. (2016) **2060:** Tan et al. (2015)

Quality assessment							Study details		No. of participants		Reported effects/outcomes	Certainty	Reference
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Publication bias	Country	Intervention	Intervention	Control			
								and solutions and strategies. The main points of the video were also addressed. A checklist was given to caregivers to remind them to implement the CLABSI preventative measures once daily. Caregivers were also given a health instruction handbook and CD that had information about CVADs, how to secure them, what CLABSIs are common signs of infection, and how to maintain the catheter while the patient performs activities. Control: *Usual Care* – nursing staff provides verbal, non-structured instructions to patients on CVAD care.	*Incidence of CLABSI after approximately 8 days of CVAD being insitu:* 0	*of CLABSI after approximately 8 days of CVAD being insitu:* 0			
							987: USA	**987:** A fact sheet was developed for caregivers, explicitly addressing the relationship between hygiene, oral care, and CLABSI prevention. The main changes were the implementation of a competency checklist during the CVAD skills class to standardize competency verification of the caregiver's skills among all instructors. Additionally, two repeated caregiver redemonstrations were added to the education process and occurred on subsequent admissions. These redemonstrations were evaluated by a nurse utilizing the same competency checklist. Control: Prior to implementing this project, caregivers received one educational session with a nurse with no follow-up opportunities for skill redemonstrations	**987:** N=81 Infections: 3	**987:** N=149 Infections: 16	**987:** There were less infections after implementing the intervention than in the period prior to implementation. Summary of effect: For every 100 people who receive education, 7 less people will have complications (ranges from 10 less to 2 more.		**987:** Altounji (2020)
							6526: Canada	**6526**: The objective of this study was to evaluate the use of instructional videos as part of the caregiver home parenteral nutrition (PN) teaching program to reduce CVAD-related complications. Caregivers of children requiring home PN were surveyed to assess skill confidence and interest in instructional videos for skill acquisition. Videos were then created using a smartphone and free video-editing software. Input from	**6526**: n=11 Catheter breakage rate (per 1000 catheter days): 1.98 Occlusion rate: 0.66	**6526**: *Control group= 2 years retrospectively Catheter breakage	**6526**: Positive (favouring video education). The percentage of patients having at least 1 CVAD-related complication dropped from 75% (for the 2 years prior to video series implementation) to 45% (over the 1 year following the video series' implementation). Patients with ≥2 CVAD-related complications decreased from 63% to 45% following distribution of the		**6526**: Pierik et al. (2021)

Quality assessment							Study details		No. of participants		Reported effects/outcomes	Certainty	Reference
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Publication bias	Country	Intervention	Intervention	Control			
								stakeholders (families, care providers) was incorporated in video production. Families were given access to the videos, and CVAD-related complications were compared for 2 years prior to and 1 year following video introduction.	Infection rate: 0 Total complication rate: 2.65	rate (per 1000 catheter days): 5.39 Occlusion rate: 1.38 Infection rate: 1.11 Total complicatio n rate: 7.88	video series. All 3 types of CVAD-related complications decreased between the 2 time periods. Line breakages decreased from 5.49 per 1000 catheter days to 1.98 per 1000 catheter days, occlusions decreased from 1.38 to 0.66 per 1000 catheter days, and bloodstream infections decreased from 1.1 to 0 per 1000 catheter days. Overall, total CVAD-related complications decreased significantly from 7.88 to 2.65 complications per 1000 catheter days.		
Hospital re-admissions (Measurements: *30-day hospital return related to CLABSI)*													
1	Quasi-experimental	Very Serious[f]	Not Serious	Not Serious	Serious[g]	Not Serious	**12842:** USA	**12842:** Intervention: Group Learning and Development (*GLAD) Model* – Group class available 4 times per week at various times on different days. There was a maximum of 6 caregivers per class. Class provided extensive education about CVAD tasks, included real life scenarios and used various learning techniques and peer support. Caregivers were encouraged to practice the skills they learned in class on their child while the bedside nurse observed and reinforced what was learned in class before discharge. Control: *Usual Care* – standard teaching by bedside nurse	**12842:** N = 105 participants (May to November 2016): 0 30-day hospital return visits related to CLABSI	**12842:** Retrospecti ve data from April 2015 to May 2016: 12 30-day hospital return visit related to CLABSI	**12842:** Over the course of the study intervention, there was no hospital re-admissions related to CLABSI compared with 12 readmissions in the year prior.	⊕○○○ Very Low	**12842:** Hicks et al. (2019)

Acronyms:

CVAD – Central Venous Access Device

CLABSI – Central Line Associated Blood Stream Infection

PICC – Peripherally Inserted Central Catheter

Explanations:

a. RCT was assessed using the Cochrane risk of bias 2.0 tool. The study was rated as high risk of bias due to no information on allocation concealment, no a priori protocol and deviations from intended interventions. We downgraded by 2.

Evidence Profile Recommendation 1.1: Vascular Access

b. Total number of events was less than 100. We downgraded by 2.

c. Based on the ROBINS-I quality appraisal tool for quasi-experimental studies, all of the included studies had critical or very serious concerns related to risk of bias due to lack of control of confounding variables, lack of measurement of fidelity and/or compliance in completing the intervention, missing data, and the assessors not being blinded to the intervention received by participants. Therefore, we downgraded by 2.

d. The types of complications assessed and the measurement tools used to assess the complications differed across studies. We downgraded by 0.5.

e. Total number of events was less than 300. We downgraded by 1.

f. Based on the ROBINS-I quality appraisal tool for quasi-experimental studies, the study had critical concerns with risk of bias related to lack of control of confounding variables, lack of reporting compliance and fidelity, no information with respect to missing data, awareness of assessors to the outcome measure and intervention received, and different time frames used across groups. Therefore, downgrade by 2.

g. The total number of events was less than the optimal number of 300. We downgraded by 1.