
# ESRD AND SAFETY LITERATURE SEARCH

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# SEARCH STRATEGY

**ESRD & Patient Safety**

**Search Terms**

A PubMed search was conducted to review literature related to patient safety and end stage renal disease. Searches were applied to all search terms for literature published between 5/1/2006 to 8/12/2006. Only articles published in English were included. A first review of articles resulted in several completely irrelevant articles being removed. Irrelevant (for example quality of life articles) and duplicate citations were removed resulting in 192 citations total.

The following search terms and search results were performed. Searches were combined and duplicates eliminated resulting in

“end stage renal disease” and “patient safety”
Results: 2

“end stage renal disease” and “safety management”
Results: none

"end stage renal disease" and safety management
Results: 6

"end stage renal disease" and "quality management"
Results: 4

"renal dialysis" and “safety management”
Results: 7

("end stage renal disease" or "renal dialysis") and errors
Results: 24

("end stage renal disease" or "renal dialysis") and safety
Results: 195

("end stage renal disease" or "renal dialysis") and "medication errors"
Results: 5

("end stage renal disease" or "renal dialysis") and "accidental falls"
Results: 4

("end stage renal disease" or "renal dialysis") and "water quality"
Results: 3

("end stage renal disease" or "renal dialysis") and "infection control"
Results: 30

("end stage renal disease" or "renal dialysis")and "equipment reuse"
Results: 4

("end stage renal disease" or "renal dialysis")and "dialyzer reuse"
Results: 3

"renal dialysis" and behavior
Results: 181

# CITATIONS

**Relevant Search Results by Author**
*Note: many of these results were retrieved by more than one of the searches outlined above.*

(2007). "Invasive methicillin-resistant Staphylococcus aureus infections among dialysis patients--United States, 2005." MMWR Morb Mortal Wkly Rep 56(9): 197-9.

Staphylococcus aureus is a leading cause of bloodstream and other invasive infections in the United States. S. aureus has become increasingly resistant to first-line antimicrobial agents in health-care settings. Dialysis patients are especially vulnerable to infections, frequently those caused by antimicrobial-resistant organisms, including methicillin-resistant Staphylococcus aureus (MRSA). To assess the incidence of invasive MRSA infection among dialysis patients in the United States during 2005, surveillance data were analyzed from the Active Bacterial Core surveillance (ABCs) system. This report summarizes the results of that analysis, which estimated that, in 2005, the incidence of invasive MRSA infection among dialysis patients was 45.2 cases per 1,000 population. Persons receiving dialysis are at high risk for infection with invasive MRSA compared with the general population, in which rates of invasive MRSA have ranged from 0.2 to 0.4 infections per 1,000 population. The findings in this report underscore the need for continued surveillance and infection-control strategies aimed at reducing infection rates and preventing additional antimicrobial resistance among persons receiving dialysis.

Abtahi, M., M. Uzan, et al. (2007). "Hemolysis-induced acute pancreatitis secondary to kinked hemodialysis blood lines." Hemodial Int 11(1): 38-41.

Hemolytic reactions have become extremely rare in chronic maintenance hemodialysis. We present the case of a young dialysis patient with hemolysis-induced acute pancreatitis secondary to kinked hemodialysis blood lines. With new blood lines on the market, attention to this aspect of dialysis is mandatory.

Almirall, J. and M. P. Valenzuela (2006). "The safety of phosphate binders." Expert Opin Drug Saf 5(5): 675-86.

Disturbances of mineral metabolism occur during the early stages of chronic kidney disease. As renal function worsens, excess dietary phosphorus accumulates and blood levels increase, that can be clearly seen when the glomerular filtration rate has fallen below 30 ml/min/1.73 m2. In patients with end stage renal disease, standard dialysis (three times/week) falls far short of removing adequate amounts of absorbed phosphorus; therefore, hyperphosphataemia is found in the majority of these patients. Hyperphosphataemia has long been associated with progression of secondary hyperparathyroidism and renal osteodystrophy, it can also lead to soft-tissue and vascular calcification. Recent observational data have associated hyperphosphataemia with increased cardiovascular mortality among dialysis patients. Adequate control of serum phosphorus remains a cornerstone in the clinical management and, despite the growing amount of available therapeutic options, achievement of NFK/KDOQI targets for mineral metabolism remain poor. Several reasons may explain the failure to adequately treat hyperphosphataemia: poor compliance with diet and phosphate binder prescriptions are common causes. Also, factors related with cost, tolerance, palatability, safety and efficacy are important. In this article, the authors review the advantages and drawbacks of conventional and emerging therapies in phosphorous binding.

Anan, F., N. Takahashi, et al. (2006). "Hyperhomocysteinemia is a significant risk factor for silent cerebral infarction in patients with chronic renal failure undergoing hemodialysis." Metabolism 55(5): 656-61.

In patients with chronic renal failure undergoing hemodialysis (HD), the presence of silent cerebral infarction (SCI) is associated with high mortality. Plasma total homocysteine (tHcy), which increases with renal dysfunction, has been flagged as a novel predictor for cerebrovascular events. We tested the hypothesis that the presence of SCI correlates with tHcy in HD patients. Based on brain magnetic resonance imaging findings, 44 patients undergoing HD were divided into a with-SCI group (61+/-9 years [mean+/-SD]; n=24) and a without-SCI group (60+/-8 years, n=20), in whom 24-hour ambulatory blood pressure monitoring was performed. The number of patients with diabetes or hypertension was not different between the 2 groups. We made the following observations: (1) the percentage of smokers was higher in the with-SCI group than in the without-SCI group (P<.05); (2) plasma levels of high-density lipoprotein cholesterol were lower and tHcy was higher in the with-SCI group than in the without-SCI group (P<.05 and P<.0001, respectively); (3) and systolic ambulatory blood pressure and mean heart rate during nighttime were higher in the with-SCI group than in the without-SCI group (P<.05). Multivariate logistic analysis identified hyperhomocysteinemia as an independent and significant risk factor for SCI (odds ratio, 1.22; 95% CI, 1.10-1.36; P<.01). Our findings indicate that plasma tHcy may be a novel useful predictor for SCI in patients with chronic renal failure undergoing HD.

Arduino, M. J., C. Lucero, et al. (2008). "Infections in dialysis patients." Nephrol News Issues 22(2): 48-50, 53, 55-7 passim.

Asif, A. (2008). "Endovascular procedures." Contrib Nephrol 161: 30-8.

Vascular access-related procedures commonly performed by nephrologists include percutaneous balloon angioplasty, intravascular coil and stent insertion, thrombectomy, vascular mapping and tunneled hemodialysis catheter-related procedures. In addition, using vein obliteration and percutaneous balloon angioplasty techniques, nephrologists have recently documented successful salvage of arteriovenous fistulas that had failed to mature, whereas traditionally these fistulas have frequently been abandoned. While the performance of these procedures by nephrologists offers many advantages, appropriate training in order to develop the necessary procedural skills is critical. Recent data have emphasized that a nephrologist can be successfully trained to become a competent interventionalist. In addition to documenting excellent outcome data, multiple reports have demonstrated the safety and success of interventional nephrology. This report focuses on hemodialysis access-related procedures performed by nephrologists and calls for a proactive approach in optimizing this aspect of patient care.

Asif, A., A. Besarab, et al. (2007). "Interventional nephrology: from episodic to coordinated vascular access care." J Nephrol 20(4): 399-405.

In recent years, nephrologists have taken the initiative of performing vascular access-related procedures themselves. Because of their unique clinical perspective on dialysis access and better understanding of the intricacies of renal replacement therapy, nephrologists are ideally suited for this activity. This approach has minimized delays, decreased hospitalizations and decreased the use of temporary catheters, thereby improving medical care, decreasing costs and increasing patient convenience. Vascular access interventions commonly employed by nephrologists include vascular

access education, vascular mapping, percutaneous balloon angioplasty, thrombectomy, intravascular coil and stent insertion and tunneled hemodialysis catheter-related procedures. While the performance of these procedures by nephrologists offers many advantages, appropriate training to develop the necessary procedural skills is critical. Recent data have emphasized that a nephrologist can be successfully trained to become a competent interventionalist. In addition to documenting excellent outcome data, multiple reports have demonstrated the safety and success of an interventional nephrology approach. The last decade has been a period of significant advances in this new field. This has been driven in part by the formation of the American Society of Diagnostic and Interventional Nephrology (ASDIN), whose mission includes training, quality assurance and certification. Recently, the ASDIN has published guidelines for training in nephrology-related procedures and has begun certifying physicians in specific procedures related to chronic kidney disease. It is anticipated that this will promote the skillful performance of these procedures by nephrologists and lead to substantial improvements in the care of renal patients. Challenges for the future include awareness of this subspecialty and development of training programs at academic centers on a larger scale.

Bell, A. L., R. Jayaraman, et al. (2006). "Effect of ethanol/trisodium citrate lock on the mechanical properties of carbothane hemodialysis catheters." Clin Nephrol 65(5): 342-8.

AIMS: The objective of this study was to investigate the effect of three locking solutions on the mechanical properties of carbothane hemodialysis catheters. METHODS: Catheters were exposed in vitro to one of three locking solutions (heparin 5000 U/ml; 4% trisodium citrate (TSC) or 30% ethanol/4% TSC). Each solution was locked in six catheters and bathed at 37 degrees C for 9 weeks. Changes in the mechanical properties namely, force at break, elongation at break and elastic modulus of the catheters were determined by tensile testing. RESULTS: The ethanol/TSC lock has an effect on the properties of carbothane hemodialysis catheters. The force at break was significantly lower in the ethanol/TSC group compared to the heparin and TSC groups (113.26 N, 191.97 N and 229.72 N, respectively, p < 0.01). Similarly, elongation at break was lower in the ethanol/TSC group, compared to the heparin and TSC groups (stretched 21.97, 38.29, and 42.42 times original length respectively, p < 0.01). The elastic modulus was not significantly different. CONCLUSIONS: The effect of the ethanol/TSC lock on the catheters is unlikely to prohibit clinical use. After 9 weeks of exposure to the solution, the catheter segments could still be stretched to 22 times their length and withstand 11.5 kg (113 N) of force. Clinically produced forces during dialysis are many times smaller than the force required to break the catheters examined in this study. Therefore, the ethanol/TSC lock shows promise as a new catheter locking solution for the treatment of catheter-related infections. Further clinical studies are required.

Besarab, A. and L. Dinwiddie (2006). "Changes noted to KDOQI guidelines for vascular access." Nephrol News Issues 20(9): 36.

Bilgic, A., A. Akgul, et al. (2007). "Nutritional status and depression, sleep disorder, and quality of life in hemodialysis patients." J Ren Nutr 17(6): 381-8.

OBJECTIVE: The malnutrition-inflammation score (MIS) is a scoring system that measures malnutrition and inflammation. We sought to explore its associations with depression, sleep disturbance, and quality of life. DESIGN: This was a cross-sectional study. SETTING: This study took place at the Baskent University Outpatient Hemodialysis Unit (Ankara, Turkey). PATIENTS: We enrolled 67 hemodialysis patients (male/female, 34/33; age, 47.7 +/- 11.4 years [mean +/- SD];

hemodialysis duration, 103.7 +/- 59.1 months [mean +/- SD]). INTERVENTION: We retrospectively recorded patients' monthly clinical and laboratory findings from the previous 6 months. The same physician calculated MIS scores. We interviewed all patients, and each completed a Beck Depression Inventory (BDI) assessment. We used the Pittsburgh Sleep Quality Index (PSQI) to assess quality of sleep, and the Medical Outcomes Study 36-item short form (SF-36) questionnaire to evaluate health-related quality of life. MAIN OUTCOME MEASURES: The main outcome measures involved the univariate and multivariate relationships of the MIS with BDI, PSQI, and SF-36. RESULTS: Patients with PSQI scores of < or = 5 ("good sleepers") had lower MIS scores than did poor sleepers (6.8 +/- 2.5 vs. 8.8 +/- 3.2, P < .05). Patients with moderate-to-severe depression (BDI score > or = 19) had higher MIS scores (9.0 +/- 3.2 vs. 6.5 +/- 2.5, P = .005) and higher PSQI scores (7.6 +/- 2.1 vs. 4.7 +/- 1.8, P = .001), compared with patients with BDI scores < 19. Increased MIS scores were correlated with increased comorbidity (P = .01) and poor SF-36 scores (P = .009). CONCLUSION: Increased MIS is significantly associated with the presence of depression, sleep disorders, and poor quality of life. This close relationship may help establish the MIS as an important determinant of the increased morbidity and mortality of hemodialysis patients.

Bird, S., G. W. Petley, et al. (2007). "Defibrillation during renal dialysis: a survey of UK practice and procedural recommendations." Resuscitation 73(3): 347-53.

INTRODUCTION: Defibrillation of patients connected to medical equipment that is not defibrillation proof risks ineffective defibrillation and harm to the operator as a result of aberrant electrical pathways taken by the defibrillation current. Many renal dialysis systems are not currently defibrillation proof. Although national and international safety standards caution against defibrillating under this circumstance, it appears to be an area of confusion that we have investigated in more detail. METHODS: Thirty renal dialysis units across the UK were invited to participate in a telephone survey of current practice from 1 October 2004 to 1 October 2005. The Medical Healthcare Regulatory Agency and renal dialysis machine manufacturers were contacted for advice, and current safety standards were reviewed. RESULTS: Twenty-eight renal dialysis units completed the survey. Seven (25%) units would not disconnect patients from dialysis equipment during defibrillation, collectively reporting 14 patients who had required defibrillation during dialysis. Eighteen (64.3%) units would disconnect patients from dialysis equipment during defibrillation, collectively reporting 29 patients who had required defibrillation during dialysis. No complications were identified by this survey, through the MHRA or through a literature search. CONCLUSION: Defibrillation of patients while undergoing renal dialysis is common practice in the UK. Although no adverse events have been reported, this practice risks injury to the patient and clinical staff, and equipment damage if the dialysis equipment is not defibrillation proof. It is in breach of national and international safety standards and should not be practiced.

Bishu, K. and R. Agarwal (2006). "Acute injury with intravenous iron and concerns regarding long-term safety." Clin J Am Soc Nephrol 1 Suppl 1: S19-23.

Intravenous iron is widely used to maintain adequate iron stores and prevent iron deficiency anemia in patients with chronic kidney disease, yet concerns remain about its long-term safety with respect to oxidative stress, kidney injury, and accelerated atherosclerosis, which are the subjects of this review. Three parenteral iron formulations are available for use in the United States: Iron dextran, iron gluconate, and iron sucrose. Iron dextran, especially the high molecular form, has been linked with anaphylactoid and anaphylactic reactions, and its use has been declining. A portion of

intravenous iron preparations is redox-active, labile iron available for direct donation to transferrin. In vitro tests show that commonly available intravenous iron formulations have differing capacities to saturate transferrin directly: Iron gluconate > iron sucrose > iron dextran. Intravenous iron treatment produces oxidative stress, as demonstrated by increases in plasma levels of lipid peroxidation products (malondialdehyde), at a point that is much earlier than the time to peak concentration of catalytically active iron, suggesting a direct effect of iron sucrose on oxidative stress. Furthermore, iron sucrose infusion produces endothelial dysfunction that seems to peak earlier than the serum level of free iron. Intravenous iron sucrose infusion also has been shown to produce acute renal injury and inflammation as demonstrated by increased urinary albumin, enzyme (N-acetyl-beta-glucosaminidase), and cytokine (chemokine monocyte chemoattractant protein-1) excretions. Although the long-term dangers of intravenous iron are unproved, these data call for examination of effects of intravenous iron on the potential for long-term harm in patients with chronic kidney disease.

Breiterman-White, R. (2006). "Infection and inflammation in patients on dialysis: an underlying contributor to anemia and epoetin alfa hyporesponse." Nephrol Nurs J 33(3): 319-22; quiz 323-4.

Acute or chronic infections or inflammatory conditions can exacerbate anemia in patients on dialysis. The primary goal is to identify and treat the underlying disorder, while minimizing the impact on hemoglobin (Hb) levels. Nurses can be instrumental in minimizing the impact of these conditions by monitoring the longitudinal trends in Hb levels, proactively assessing patients for inflammatory or infectious conditions, and intervening to resolve causative conditions and minimize the impact on anemia.

Buturovic-Ponikvar, J., J. Gubensek, et al. (2008). "Citrate anticoagulation for postdilutional online hemodiafiltration with calcium-containing dialysate and infusate: significant clotting in the venous bubble trap." Int J Artif Organs 31(4): 323-8.

BACKGROUND: The aim of this prospective clinical study was to assess safety and antithrombotic efficacy of a regional citrate anticoagulation protocol for postdilutional online hemodiafiltration (HDF) with calcium-containing dialysate and infusate. METHODS: Nineteen postdilutional online HDF procedures with citrate anticoagulation were performed in 9 end-stage renal disease patients. Calcium-containing (1.25 mmol/L dialysate/infusate, 15% (0.51 mol/L) trisodium citrate and 1 mol/L calcium chloride (when necessary) were used; the blood flow was 300 ml/min. Antithrombotic effect was assessed visually after HDF at 3 points: the dialyzer, arterial bubble trap, and venous bubble trap, using a score of 5 (excellent anticoagulation) to 1 (total clotting). The study was terminated prematurely due to frequent clotting in the venous bubble trap. RESULTS: The mean duration of HDF was 4.3 +/- 0.9 hours; infusion volume was 13 +/- 2 L. Almost half of the HDF procedures (9/19, 47%) were completed with some difficulty: in 1 case (1/19, 5%) there was total system clotting; in the other 8 cases, system clotting was threatening and dialysis was terminated prematurely, but in only 4/19 cases (21%) prior to 4-hour duration. The main point of clot formation was the venous bubble trap (score 2.6 +/- 1.0), while anticoagulation was very good at the dialyzer (4.0 +/- 1.2) and excellent at the arterial bubble trap (4.8 +/- 0.9). No side effects were noted, and metabolic consequences were moderate. CONCLUSIONS: Regional citrate anticoagulation using calcium-containing dialysate/infusate during postdilutional online hemodiafiltration results in a high incidence of venous bubble trap clotting.

Caliskan, K., T. Z. Nursal, et al. (2007). "The adequacy of laparoscopy for continuous ambulatory peritoneal dialysis procedures." Transplant Proc 39(5): 1359-61.

The aim of this study was to determine the safety and efficacy of diagnostic/therapeutic laparoscopy in the management of peritoneal Tenchoff catheter placement in end-stage renal disease patients who had previous abdominal surgery and malfunctioning peritoneal dialysis catheters. From 1999 to 2004, 16 videolaparoscopic procedures were performed in 16 patients who had previous laparotomies. Laparoscopy was performed before peritoneal catheter placement in seven (group 1) and in 9 patients with peritoneal dialysis catheters in place, laparoscopy was performed for the management of catheter dysfunction (group 2). All laparoscopic procedures were performed under general anesthesia. The mean follow-up was 31.5 (range, 11 to 60) months. In group 1, six patients (85.7%), and in group 2, seven patients (77.7%) are still on peritoneal dialysis. Laparoscopy resulted in the placement/salvage of peritoneal dialysis catheter dysfunction. Placement of catheter was accomplished in patients who would have been previously designated as unsuitable candidates. Laparoscopy is a useful tool in every step of a peritoneal dialysis program.

Campbell, S. G., P. Croskerry, et al. (2007). "Profiles in patient safety: A "perfect storm" in the emergency department." Acad Emerg Med 14(8): 743-9.

Correct and rapid diagnosis is pivotal to the practice of emergency medicine, yet the chaotic and ill-structured emergency department environment is fertile ground for the commission of diagnostic error. Errors may result from specific error-producing conditions (EPCs) or, more frequently, from an interaction between such conditions. These EPCs are often expedient and serve to shorten the decision making process in a high-pressure environment. Recognizing that they will inevitably exist, it is important for clinicians to understand and manage their dangers. The authors present a case of delayed diagnosis resulting from the interaction of a number of EPCs that produced a "perfect" situation to produce a missed or delayed diagnosis. They offer practical suggestions whereby clinicians may decrease their chances of becoming victims of these influences.

Carter, B. and M. Keen (2007). "Safety of erythropoiesis stimulating agents in patients on dialysis: current issues for nephrology nurses." Nephrol Nurs J 34(3): 311-5.

Clinical data have repeatedly shown that the erythropoiesis stimulating agents (ESAs) Epoetin alfa and darbepoetin alfa are safe and efficacious to treat anemia in patients on dialysis when used in accordance with the product label The safety profile of ESAs has recently been updated based on reports from clinical investigations that studied off-label uses of ESAs at doses designed to raise the Hb to above 13.0 g/dL. This article reviews the recent safety data and the current prescribing recommendations, with an emphasis on the need to follow the guidelines found in the products' package inserts to ensure the safe and efficacious use of these agents.

Cases, A. (2007). "The latest advances in kidney diseases and related disorders." Drug News Perspect 20(10): 647-54.

The 40th Annual Meeting of the American Society of Nephrology was held in San Francisco, California, U.S.A., October 31-November 5, 2007. This meeting offered the latest findings in basic and clinical nephrology science and was attended by more than 11,000 nephrologists and related scientists from around the world. Recent data on the results of new drugs for the treatment of renal anemia that are under development, such as the continuous erythropoietin receptor activator (CERA), Hematidetrade mark, or the orally active prolyl hydroxylase inhibitors (FG-2216, FG-4592) were presented. The effect of clopidogrel on arteriovenous fistula patency and

suitability, and the effects of the use of high-flux membranes on mortality in incident hemodialysis patients were also shown. The renoprotective effects of high doses of candesartan in chronic kidney disease patients with proteinuria or the additional antiproteinuric effects of aliskiren on top of angiotensin AT(1) receptor antagonism in patients with diabetic nephropathy were demonstrated. Recent studies that evaluated the efficacy and safety of new immunosuppressive strategies without calcineurin inhibitors in renal transplant recipients were also reviewed during the congress.

Chan, J. C., R. Scott, et al. (2008). "Safety and efficacy of sitagliptin in patients with type 2 diabetes and chronic renal insufficiency." Diabetes Obes Metab 10(7): 545-55.

OBJECTIVE: To assess the safety of sitagliptin in patients with type 2 diabetes and moderate [creatinine clearance (CrCl) > or =30 to <50 ml/min] or severe renal insufficiency [CrCl <30 ml/min including patients with end-stage renal disease (ESRD) on dialysis]. The efficacy of sitagliptin in this patient population was also assessed. METHODS: In a 54-week, randomized, double-blind, parallel-group study, patients with baseline glycosylated haemoglobin A(1c) (HbA(1c)) values of 6.5-10% were allocated (2:1) to sitagliptin (for 54 weeks) or the sequence of placebo (for 12 weeks) followed by active treatment with glipizide (for 42 weeks). To achieve plasma concentrations similar to those observed in patients with normal renal function treated with 100 mg sitagliptin once daily, patients with moderate renal insufficiency were allocated to receive sitagliptin 50 mg once daily and patients with severe renal insufficiency to receive 25 mg once daily. Glipizide treatment was initiated at 2.5 or 5 mg/day and uptitrated to a maximum of 20 mg/day. RESULTS: Patients (N = 91) with a mean baseline HbA(1c) value of 7.7% (range: 6.2-10.3%) were randomized to sitagliptin (n = 65) or placebo (n = 26). After 12 weeks, the mean change [95% confidence interval (CI)] from baseline in HbA(1c) was -0.6% (-0.8, -0.4) in the sitagliptin group compared with -0.2% (-0.4, 0.1) in the placebo group [between-group difference (95% CI) = -0.4% (-0.7, -0.1)]. At 54 weeks, patients continuously treated with sitagliptin had a mean change (95% CI) from baseline in HbA(1c) of -0.7% (-0.9, -0.4). The overall incidence of adverse experiences was generally similar between groups. Between-group differences in incidences of specific clinical adverse experiences were generally small; however, the proportion of patients for whom hypoglycaemia was reported was lower in the sitagliptin group (4.6%) compared with the placebo/glipizide group (23.1%). Consistent with the high mortality risk in this patient population, there were six deaths during this 54-week study [5 of 65 patients (7.7%) in the sitagliptin group and 1 of 26 patients (3.8%) in the placebo/glipizide group]; no death was considered by the investigator to be drug related. The overall incidences of drug-related and serious adverse experiences and discontinuations because of adverse experiences were generally similar between groups. CONCLUSIONS: In this study, sitagliptin was generally well tolerated and provided effective glycaemic control in patients with type 2 diabetes and moderate to severe renal insufficiency, including patients with ESRD on dialysis.

Chanard, J., S. Lavaud, et al. (2008). "The clinical evaluation of low-dose heparin in haemodialysis: a prospective study using the heparin-coated AN69 ST membrane." Nephrol Dial Transplant 23(6): 2003-9.

BACKGROUND: The AN69 ST haemodialysis membrane, a new membrane resulting from coating polyethyleneimine upon the polyacrylonitrile surface, binds heparin. In patients at risk of bleeding, a pilot study has demonstrated the efficient anticoagulant effect of this heparin-coated membrane. Study design. In chronic haemodialyzed patients, we evaluated whether this anticoagulant effect can be validated in a controlled, prospective, open study. Pragmatically, we

tested the hypothesis of no difference of the massive clotting rate in two groups of patients haemodialyzed either with 50% reduced standard doses of nonfractionated heparin using the heparin-coated AN69 ST or with a full dose of heparin (100%) using another type of dialysis membrane that does not bind heparin. Secondary objectives included evaluation of partial clotting, changes in haemoglobin levels, erythropoietin consumption and dialyzer performances. RESULTS: One hundred and eighty-four patients were elected and 170 finally included in an 18-month follow-up study. They were allocated to one of the two arms of the study. In the heparin-reduced group (n = 85, mean age: 73 +/- 11 years), 12 472 sessions were performed after priming the AN69 ST dialyzer with 2 L of heparinized saline (5000 IU/L heparin) and using 50% reduced doses of previously administered heparin. In the control group with standard heparin (n = 85, mean age: 74 +/- 13 years), 14 154 sessions were analysed (NS), and mean heparin doses were 2718 +/- 1388 and 4800 +/- 1564 IU per session, respectively ($P < 0.001$). In the heparin-reduced group, massive clotting occurred in 1.4 per 1000 sessions, whereas it occurred in 1.6 per 1000 sessions in the standard heparin group ($P < 0.05$). Mild to moderate partial clotting in the venous drip chamber and in the dialyzer was evaluated in a subset of patients, on a visual scale. It was more frequent in the experimental group than in the control group ($P < 0.001$). Platelets, haemoglobin levels, erythropoietin needs and dialyzer performances remained unchanged in both groups. The global mean death rate was 16.8% per year and did not differ significantly between groups. CONCLUSION: The use of the heparin-coated AN69 ST membrane allows a 50% reduction of standard doses of nonfractionated heparin administration for routine haemo- dialysis without increasing the risk of massive clotting of the extracorporeal circuit. This result needs confirmation since massive clotting questions clinical practice and is team dependent.

Clark, J. A., G. Schulman, et al. (2008). "Safety and efficacy of regional citrate anticoagulation during 8-hour sustained low-efficiency dialysis." Clin J Am Soc Nephrol 3(3): 736-42.

BACKGROUND AND OBJECTIVES: Patients who may benefit from sustained low-efficiency dialysis therapy are often at risk for bleeding. A safe and simple "regional" anticoagulation strategy would be beneficial. The modification of existing regional citrate anticoagulation protocols to typically performed 8-h sustained low-efficiency dialysis is necessary. DESIGN, SETTING, PARTICIPANTS, & MEASUREMENTS: Sustained low-efficiency dialysis was performed at blood and dialysate rates of 250 and 300 ml/min, respectively. The circuit was anticoagulated with 4% sodium citrate (citrate 136, sodium 408 mmol/L) and reversed with CaCl(2). Every 2 h, electrolytes, ionized circuit, and patient calcium were monitored during the first two versions. The second version differed by an increased infusion of CaCl(2) and lower infusion of citrate, both by 10%. The third version measured only laboratory values before and after sustained low-efficiency dialysis. RESULTS: There were 41 treatments in the first iteration, 42 in the second, and 34 in the final iteration. All versions were titrated to maintain patient ionized calcium of 4.0 to 4.8 mg/dl (1.0 to 1.2 mmol/L) and the circuit ionized calcium between 0.8 and 1.6 mg/dl (0.2 and 0.4 mmol/L). The final protocol infusion was 31 mmol/h citrate and 41 mmol/h elemental calcium, which kept circuit and patient ionized calcium at targets. No unexpected metabolic complications occurred. CONCLUSIONS: Compared with continuous renal replacement therapy, one must increase the calcium infusion because of the more efficient removal of the calcium citrate complex. Safe and effective regional citrate anticoagulation can be performed in 8-h sustained low-efficiency dialysis without metabolic complications with laboratory surveillance only before and after sustained low-efficiency dialysis treatment; however, certain safeguards are mandatory.

Clark, T., G. D. Huhn, et al. (2006). "Outbreak of bloodstream infection with the mold Phialemonium among patients receiving dialysis at a hemodialysis unit." Infect Control Hosp Epidemiol 27(11): 1164-70.

BACKGROUND: Molds are a rare cause of disseminated infection among dialysis patients. OBJECTIVE: We evaluated a cluster of intravascular infections with the mold Phialemonium among patients receiving hemodialysis at the same facility in order to identify possible environmental sources and prevent further infection. DESIGN: Environmental assessment and case-control study. SETTING: A hemodialysis center affiliated with a tertiary care hospital. METHODS: We reviewed surveillance and clinical microbiology records and performed a blood culture survey for all patients. The following data for case patients were compared with those for control patients: underlying illness, dialysis characteristics, medications, and other possible exposure for 120 days prior to infection. Environmental assessment of water treatment, dialysis facilities, and heating, ventilation, and air-conditioning (HVAC) systems of the current and previous locations of the dialysis center was performed. Samples were cultured for fungus; Phialemonium isolates were confirmed by sequencing of DNA. Investigators observed dialysis access site disinfection technique. RESULTS: Four patients were confirmed as case patients, defined as a patient having intravascular infection with Phialemonium species; 3 presented with fungemia, and 1 presented with an intravascular graft infection. All case patients used a fistula or graft for dialysis access, as did 12 (75%) of 16 of control patients (P=.54). Case and control patients did not differ in other dialysis characteristics, medications received, physiologic findings, or demographic factors. Phialemonium species were not recovered from samples of water or dialysis machines, but were recovered from the condensation drip pans under the blowers of the HVAC system that supplied air to the dialysis center. Observational study of 21 patients detected suboptimal contact time with antiseptic agents used to prepare dialysis access sites. CONCLUSION: The report of this outbreak adds to previous published reports of Phialemonium infection occurring in immunocompromised patients who likely acquired infection in the healthcare setting. Recovery of this mold from blood culture should be considered indicative of infection until proven otherwise. Furthermore, an investigation into possible healthcare-related environmental reservoirs should be considered.

Concepcion, D. B. (2008). "The environmental aspects of infection control in the dialysis clinic." Nephrol News Issues 22(3): 36, 39-41.

Cook, W. L., G. Tomlinson, et al. (2006). "Falls and fall-related injuries in older dialysis patients." Clin J Am Soc Nephrol 1(6): 1197-204.

Dialysis patients are increasingly older and more disabled. In community-dwelling seniors without kidney disease, falls commonly predict hospitalization, the onset of frailty, and the need for institutional care. Effective fall prevention strategies are available. On the basis of retrospective data, it was hypothesized that the fall rates of older (> or =65 yr) chronic outpatient hemodialysis (HD) patients would be higher than published rates for community-dwelling seniors (0.6 to 0.8 falls/patient-year). It also was hypothesized that risk factors for falls in dialysis outpatients would include polypharmacy, dialysis-related hypotension, cognitive impairment, and decreased functional status. Using a prospective cohort study design, HD patients who were > or =65 yr of age at a large academic dialysis unit were recruited. All study participants underwent baseline screening for fall risk factors. Patients were followed prospectively for a minimum of 1 yr. Falls were identified through biweekly patient interviews in the HD unit. A total of 162 patients

(mean age 74.7 yr) were recruited; 57% were male. A total of 305 falls occurred in 76 (47%) patients over 190.5 person-years of follow-up (fall-incidence 1.60 falls/person-year). Injuries occurred in 19% of falls; 41 patients had multiple falls. Associated risk factors included age, comorbidity, mean predialysis systolic BP, and a history of falls. In the HD population, the fall risk is higher than in the general community, and fall-related morbidity is high. Better identification of HD patients who are at risk for falls and targeted fall intervention strategies are required.

Cukor, D., J. Coplan, et al. (2007). "Depression and anxiety in urban hemodialysis patients." Clin J Am Soc Nephrol 2(3): 484-90.

Depression is well established as a prevalent mental health problem for people with ESRD and is associated with morbidity and mortality. However, depression in this population remains difficult to assess and is undertreated. Current estimates suggest a 20 to 30% prevalence of depression that meets diagnostic criteria in this population. The extent of other psychopathology in patients with ESRD is largely unknown. The aim of this study was to expand the research on psychiatric complications of ESRD and examine the prevalence of a broad range of psychopathology in an urban hemodialysis center and their impact on quality of life. With the use of a clinician-administered semistructured interview in this randomly selected sample of 70 predominately black patients, >70% were found to have a psychiatric diagnosis. Twenty-nine percent had a current depressive disorder: 20% had major depression, and 9% had a diagnosis of dysthymia or depression not otherwise specified. Twenty-seven percent had a current major anxiety disorder. A current substance abuse diagnosis was found in 19%, and 10% had a psychotic disorder. The mean Beck Depression Inventory score was 12.1 +/- 9.8. Only 13% reported being in current treatment by a mental health provider, and only 5% reported being prescribed psychiatric medication by their physician. A total of 7.1% had compound depression or depression coexistent with another psychiatric disorder. The construct of depression was also disentangled from the somatic effects of poor medical health by demonstrating a unique relationship between depressive affect and depression diagnosis, independent of health status. This study also suggests the utility of cognitive variables as a meaningful way of understanding the differences between patients who have ESRD with clinical depression or other diagnoses and those who have no psychiatric comorbidity. The findings of both concurrent and isolated anxiety suggest that the prevalence of psychopathology in patients with ESRD might be higher than previously expected, and the disorders may need to be treated independently. In addition, the data suggest that cognitive behavioral therapeutic techniques may be especially advantageous in this population of patients who are treated with many medications.

Day, S., J. Dalto, et al. (2006). "Failure mode and effects analysis as a performance improvement tool in trauma." J Trauma Nurs 13(3): 111-7.

INTRODUCTION: Performance improvement (PI) in the multiple systems injured patient frequently highlights areas for improvement in overall hospital care processes. Failure mode effects analysis (FMEA) is an effective tool to assess and prioritize areas of risk in clinical practice. Failure mode effects analysis is often initiated by a "near-miss" or concern for risk as opposed to a root cause analysis that is initiated solely after a sentinel event. In contrast to a root cause analysis, the FMEA looks more broadly at processes involved in the delivery of care. The purpose of this abstract was to demonstrate the usefulness of FMEA as a PI tool by describing an event and following the event through the healthcare delivery PI processes involved. DESCRIPTION: During

routine chart abstraction, a trauma registrar found that an elderly trauma patient admitted with a subdural hematoma inadvertently received heparin during the course of a dialysis treatment. Although heparin use was contraindicated in this patient, there were no sequelae as a result of the error. This case was reviewed by the trauma service PI committee and the quality improvement team, which initiated FMEA. EVALUATION: An FMEA of inpatient dialysis process was conducted following this incident. The process included physician, nursing, and allied health representatives involved in dialysis. As part of the process, observations of dialysis treatments and staff interviews were conducted. Observation revealed that nurses generally left the patient's room and did not involve themselves in the dialysis process. A formal patient "pass-off" report was not done. Nurses did not review dialysis orders or reevaluate the treatment plan before treatment. We found that several areas of our current practice placed our patients at risk. 1. The nephrology consult/dialysis communication process was inconsistent. 2. Scheduling of treatments for chronic dialysis patients could occur without a formal consult or order. 3. RNs were not consistently involved in dialysis scheduling, setup, or treatment. 4. Dialysis technicians may exceed scope of practice (taking telephone orders) when scheduling of treatment occurred before consult and written orders. OUTCOMES: Near-miss events may be overlooked as opportunities for improvement in cases where no harm has come to the patient. As a result of our FMEA investigation, the following recommendations were made to improve hospital care delivery in those trauma patients who require inpatient dialysis: 1. Education of RNs about the dialysis process. 2. Implementation of a formal reporting process between the RN and the dialysis technician before the procedure is initiated. 3. RN supervision of dialysis treatments. 4. Use of a preprinted inpatient dialysis form. 5. Education of dialysis technicians regarding their scope of practice. 6. Improve notification process for scheduling dialysis procedures between units and dialysis coordinator (similar to x-ray scheduling). Our performance improvement focus has broadened to include all reported "near-miss" events in order to improve our healthcare delivery process before an event with sequelae occurs. We have found that using FMEA has greatly increased our ability to facilitate change across all services and departments within the hospital.

Dunlap, J. T. (2007). "Methicillin-resistant Staphylococcus aureus in critical care areas." Crit Care Nurs Clin North Am 19(1): 61-8.

In recent years the mainstay of treatment for hospital-associated MRSA infections has been vancomycin, but now vancomycin intermediate S aureus strains are beginning to emerge. Complete vancomycin resistant S aureus can develop, possessing the same vanA gene as vancomycin-resistant enterococcus. Four such isolates have been reported, three of which have been in the United States. There are new antibiotics being developed, but there is always a risk of resistance developing. There are some promising new ideas such as staphylococcal conjugate vaccines that reduce the rates of S aureus bacteremia for up to 10 months postimmunization in patients who have end stage renal disease receiving hemodialysis, but studies are ongoing. With all the uncertainty surrounding treatment, at least one medium has remained consistent and effective if used properly--infection control. But this requires complete support of all healthcare workers and hospital administration from the chief medical officer to doctors and nurses to environmental services personnel to take ownership of an effective infection control program. Who will advocate for more stringent infection control policies and for the equipment to successfully carry them out? Who will take the lead by ensuring implementation of infection control policies on a unit is effective? Who will hold themselves and other health care workers including physicians accountable to comply with these infection control policies every time they enter a patient's room? Nurses are on the front

lines in the battle against antibiotic-resistant nosocomial infections such as MRSA, and we should not be apathetic or feel we are helpless. It is our duty as patient advocates not to take a spectator role but to answer these questions: "I will."

Dutka, P. (2007). "Hidden hemolysis." Nephrol Nurs J 34(2): 223-4.

The exact cause of this case of hemolysis has not been definitively determined, although evidence has pointed to a possible defect in the dialysis blood lines, which remains the only plausible etiology. However, we must always keep patient safety at the forefront so that the cause can be identified. The majority of our dialysis nursing staff has had extensive hemodialysis experience with the current equipment. None of us had ever experienced hemolysis before. When the etiology remained elusive, we kept struggling with the thought of "Why after all these years?" We must never lose sight of the fact that day in and day out we perform thousands of technologically complex procedures that have many potential complications. Since this incident, we have heard of other similar cases past and present. We reached out to a company that assists with medical investigations to determine if this was being experienced in other facilities. Since then, other facilities have contacted us with very similar stories. Why are we seeing more of this now? Do higher hemoglobins in our patients play a role in this? Are proper quality controls followed by manufacturers? There are many questions that need to be answered and research to be done. Lastly, as medical professionals, we must network and share the information we have been able to gather. This is about patient safety, not blame.

Elizabeth, J. L., L. Hanna, et al. (2006). "Pre-dialysis education and patient choice." J Ren Care 32(4): 214-20.

The discussion was initiated by a paper on the influence of a pre-dialysis education programme on the mode of renal replacement therapy by Goovaerts et al (NDT 2005). Barriers to the uptake of self-care treatment modalities, including late referral, limited availability of treatment options, reimbursement, support from staff and families, the requirement for a helper and the length of the training programmes for home haemodialysis (HD) were discussed by 21 participants from 12 countries. The 'take-home' messages from the discussion were that to optimise the uptake of self-care modalities, renal units should try to ensure the all patients who are able to choose are fully informed before starting dialysis, even if they are referred to the unit very late. Offering a wide range of treatment options to new patients, and allowing (or encouraging) home HD without a helper, may also increase the number of patients who start and stay on a self-care modality. It should be possible to provide an acceptable level of training, without compromising on safety, within 3 weeks if the patient is confident with needling.

Fisher, L., H. S. Cairns, et al. (2006). "Psychological intervention in fluid management." Palliat Support Care 4(4): 419-24.

BACKGROUND: Hemodialysis is a palliative treatment for patients with established renal failure (ERF), and volume overload is a common problem for hemodialysis patients with low urinary output. Volume overload is thought to be mostly attributable to interdialytic fluid intake by the patient and is associated with an increased symptom burden and the development of serious medical complications. Repeated episodes of volume overload may adversely affect staff-patient relationships and the perception of care in this patient population. The aim of this case series study was to evaluate the effect and experience of a psychological intervention on interdialytic weight

gain in a small group of patients. METHODS: Five patients were treated. The intervention involved using techniques derived from both cognitive behavior therapy and motivational interviewing. The main outcome measures were interdialytic weight gain and patient perception of the intervention. RESULTS: Three of the five patients reduced both mean interdialytic weight gain and the frequency with which they gained in excess of 3% of their dry weight during the intervention phase. The intervention was found to be acceptable to patients. SIGNIFICANCE OF RESULTS: The intervention was effective in helping three of the five patients to reduce both the frequency and the severity of volume overload, and two of these patients maintained this for at least 6 months post intervention. The intervention used actively engaged the patients and appeared to be experienced positively. The methods used to mobilize patient resources and optimize staff-patient relationships as vehicles of change are discussed. Both may have implications for treatment concordance and the perception of care delivered.

Friedman, E. A. (2006). "Calcium-based phosphate binders are appropriate in chronic renal failure." Clin J Am Soc Nephrol 1(4): 704-9.

Many nephrologists feel threatened by the allegation that, in patients with chronic renal failure, treatment with calcium-based phosphate binders (calcium acetate and calcium carbonate) may induce coronary artery and cardiac calcification, thereby imposing a greater risk for death compared with sevelamer, a non-calcium-based binder. Acknowledging that drug manufacturers are not unaware of the marketing advantage to their product consequent to destabilizing demand for competing drugs, the case for and against abandoning calcium-based phosphate binders in favor of sevelamer is reviewed in this study. The case for continuing prescription of calcium-based phosphate binders stands on the following: (1) flawed clinical trials that favor sevelamer as a replacement; (2) weak evidence that oral calcium intake modulates vascular and/or cardiac calcification; (3) clinical trials that reinforce the safety and efficacy of calcium-based phosphate binders; and (4) the inordinate relative cost of sevelamer. Recognizing that established as well as novel phosphate binders are currently undergoing clinical evaluation, an open mind and an awareness of developing literature are necessary when deciding how to manage hyperphosphatemia in renal failure.

George, A., J. I. Tokars, et al. (2006). "Reducing dialysis associated bacteraemia, and recommendations for surveillance in the United Kingdom: prospective study." BMJ 332(7555): 1435.

PROBLEM: Bacteraemia in dialysis units accounts for major morbidity, mortality, and antibiotic usage. Risk is much greater when lines rather than fistulas are used for haemodialysis. Surveillance is critical for infection control, but no standardised surveillance scheme exists in the United Kingdom. DESIGN: Prospective study in a London dialysis unit of the implementation and applicability of a dialysis associated bacteraemia surveillance scheme developed in the United States and its effect on bacteraemia, antibiotic usage, and admission. SETTING: Hammersmith Hospital dialysis unit, London, where 112 outpatients receive dialysis three times weekly. Between June 2002 and December 2004, 3418 patient months of data were collected. KEY MEASURES FOR IMPROVEMENT: Successful adoption of the scheme and reductions in bacteraemia rates, antibiotic usage, and admission to hospital. Strategy for improvement Embedding the surveillance scheme in the unit's clinical activity. EFFECTS OF CHANGE: Raised awareness of bacteraemia prevention, prudent antibiotic prescribing, and the need for improved provision of vascular access. The scheme required two hours a month of consultant time. Significant downward trends were seen

in bacteraemia rates and antibiotic usage: mean rate ratios from quarter to quarter 0.90 (95% confidence interval 0.85 to 0.94) and 0.91 (0.87 to 0.96), respectively. The rate of admission to hospital also showed a significant downward trend, with admissions directly connected to access related infection declining more rapidly: mean rate ratio of successive quarters 0.90 (0.84 to 0.96). The overall proportion of patients dialysed through catheters was significantly higher than in US outpatient centres (62.3% v 29.4%, P < 0.01). Study data were successfully used in a business case to improve access provision. LESSONS LEARNT: Dialysis specific surveillance of bacteraemia is critical to infection control in dialysis units and improving quality of care. Such a scheme could be adopted across the United Kingdom.

Ghafur, A., M. Raza, et al. (2007). "Travel-associated acquisition of hepatitis C virus infection in patients receiving haemodialysis." Nephrol Dial Transplant 22(9): 2640-4.

BACKGROUND: It has been proposed that hepatitis C virus (HCV)-infected patients with end-stage renal disease undergoing maintenance haemodialysis may lack HCV antibody (anti-HCV) despite chronic HCV viraemia. This carries important implications for the design of surveillance policies. METHODS: To characterize the prevalence of antibody-negative/RNA-positive HCV infection, patients attending seven haemodialysis units underwent anti-HCV testing using a third-generation assay and HCV RNA testing using real-time PCR. RESULTS: At screening, anti-HCV prevalence was 12/360 (3.3%; 95% CI 1.7-5.8%); 7/12 (58.3%) anti-HCV positive samples were HCV RNA positive. Among anti-HCV-negative samples, 2/348 (0.6%; 95% CI 0.2-2.1%) tested HCV RNA positive (genotype 1a). Retrospective testing of stored sera dated the infections to a period of holiday in the Indian subcontinent. The two infections were unrelated by HCV-NS5B sequencing. Only one of the two newly infected persons showed raised transaminases. Both developed anti-HCV within 8-13 weeks of follow-up. Prospective surveillance of travellers to resource-limited countries returning to the units showed a HCV incidence of 4/153 travel episodes (2.6%; 95% CI 0.7-6.6%) among 131 persons (3.1%; 95% CI 0.8-7.6%). CONCLUSIONS: Among haemodialysis patients in the United Kingdom, antibody-negative/RNA-positive HCV status is associated with newly acquired infection, rather than lack of antibody responses in chronic HCV infection. There is a significant risk of HCV infection associated with travel to resource-limited countries. Given that transaminase levels may be normal, HCV RNA testing is recommended in patients re-entering a dialysis unit following haemodialysis in settings where suboptimal infection control policies pose a risk of exposure to blood-borne viruses.

Goldman, R. S. (2008). "Medical director responsibilities regarding disruptive behavior in the dialysis center--leading effective conflict resolution." Semin Dial 21(3): 245-9.

Medical directors are directly or indirectly responsible for everything that occurs in a dialysis facility. The proposed Conditions of Coverage require medical directors to oversee the process resulting in involuntary discharges from the facility. Involuntary discharges result in high costs to the patient, family, facility and payers. Consequently, End Stage Renal Disease (ESRD) Networks oversee individual facility involuntary discharge rates. A large national survey found that involuntary discharges were due to disruptive behaviors, most commonly nonadherence to medical advice. Medical directors should create an environment designed to assure that disruptive behavior and conflict can be resolved. This is best done by using positive interventions before involuntary discharge, by developing policies and procedures that are implemented continuously and by continually teaching these principles. There are two excellent references about dialysis-related disruptive behavior and conflict resolution: (1) the Renal Physician Association's second guideline,

"Shared Decision Making in the Appropriate Initiation and Withdrawal from Dialysis," and (2) The Dialysis Patient Provider Conflict Project. Both will aid medical directors meet their conflict-resolving responsibilities under the proposed, federal regulations.

Golestaneh, L., J. Laut, et al. (2006). "Favourable outcomes in episodes of Pseudomonas bacteraemia when associated with tunnelled cuffed catheters (TCCs) in chronic haemodialysis patients." Nephrol Dial Transplant 21(5): 1328-33.

BACKGROUND: Pseudomonas is regarded as a particularly lethal bacterial isolate. High mortality rates have been reported in episodes of Pseudomonas sepsis when associated with visceral infections as seen in immunosuppressed, hospitalized patients. In comparison, lower mortality rates have been reported with catheter-associated Pseudomonas bacteraemia in non-dialysis patients. The purpose of this study was to determine the risk factors and the outcomes for episodes of Pseudomonas bacteraemia associated with the use of tunnelled cuffed haemodialysis catheters (TCCs) in a chronic out-patient population. METHODS: We performed a prospective observational study in seven chronic haemodialysis units over a 2.5 year period. Patients who were diagnosed as having their initial TCC-associated bacteraemia within the study period were followed for 3 months. All episodes of Pseudomonas TCC bacteraemia were identified, and univariate analyses were performed to compare Pseudomonas bacteraemia with non-Pseudomonas bacteraemia. RESULTS: During the study period, 219 episodes of TCC bacteraemia were identified; 18 had a Pseudomonas isolate (8%). Pseudomonas bacteraemia episodes were associated with a significantly higher risk of not receiving appropriate initial antibiotics (odds ratio = 3.6, P = 0.02). There were no deaths in the Pseudomonas bacteraemia group, whereas 19% died in the non-Pseudomonas group. The TCC was removed in 89% of Pseudomonas bacteraemias. There were no significant risk factors for acquiring a Pseudomonas isolate, and no difference in recurrent bacteraemia or infectious complication rates between the groups. CONCLUSIONS: In haemodialysis patients with a TCC-associated Pseudomonas bacteraemia, outcomes are remarkably good. This may be because the source of Pseudomonas infection was removed in most cases. Initial antibiotic coverage lacking anti-Pseudomonas activity was not associated with increased mortality.

Gordin, F. M., M. E. Schultz, et al. (2007). "A cluster of hemodialysis-related bacteremia linked to artificial fingernails." Infect Control Hosp Epidemiol 28(6): 743-4.

We examined a cluster of 5 hemodialysis patients who contracted gram-negative bacteremia. A nurse who used an artificial fingernail to open a vial of heparin that was mixed to make a flush solution had a culture of an artificial fingernail specimen positive for Serratia marcescens. The typing of the S. marcescens strains isolated from the 5 patients and the nurse showed them to be identical. This finding provides strong support for policies prohibiting artificial nails for healthcare workers in all hemodialysis units.

Griveas, I., G. Germanidis, et al. (2007). "Acute hepatitis C in patients receiving hemodialysis." Ren Fail 29(6): 731-6.

Hepatitis C virus (HCV) infection is frequent in patients with end-stage renal disease treated by chronic dialysis, with a prevalence varying from 10-65% according to the geographical data. The prevalence is significantly associated with the duration of dialysis and the number of transfused blood products[1,2] and has dramatically declined with efficient blood screening.[3] We studied patients with acute HCV infection in a dialysis unit. The diagnosis was based on both anti-HCV detection and HCV-RNA detection. Other virological tools including HCV genotype determination

was also used to tailor treatment to the individual patient and determine its efficacy for a one-year follow-up period. Seventeen patients (7 male and 10 female, mean age: 63.7 +/- 11.6 SD) with acute hepatitis C were enrolled to our study. All of them were followed up for a period of one year after the diagnosis was established. Phylogenetic analysis distinguished two separate HCV subtypes 1b, which were both responsible for this acute infection (see Figure 1). These types did not differ in their behavior on the clinical situation of our patients, as confirmed by the fact that in both groups of patients, there was only one patient who presented with acute illness. Six patients of our study group, three months after the acute infection, received pegylated interferon (Peg-IFNa2a) 135 mug for a six-month period. Four of them responded very well to therapy and at the first determination HCV RNA was below the cutoff point. One of our patients with very high HCV levels (HCV RNA > 50,000,000 IU/mL), despite receiving the same therapy, did not respond well and developed cirrhosis. In conclusion, it is clear from our experience that better information is needed about the current incidence, prevalence, and risk factors for HCV infection in dialysis patients. Algorithms for the diagnosis and management of hepatitis C should be developed by academic societies. Routine screening for hepatitis C also would allow for better definition of the natural history of hepatitis C in patients with end stage renal disease. [image omitted]Figure 1. NS 5B gene phylogenetic tree analysis of the acute hepatitis C epidemic.

Hadley, A. C., T. B. Karchmer, et al. (2007). "The prevalence of resistant bacterial colonization in chronic hemodialysis patients." Am J Nephrol 27(4): 352-9.

BACKGROUND: Hospitalized dialysis patients are at increased risk for colonization and infection with resistant bacterial strains. METHODS: We performed a cross-sectional analysis of the prevalence of methicillin-resistant Staphylococcus aureus (MRSA) and vancomycin-resistant Enterococcus (VRE) colonization in 198 hemodialysis outpatients, 75 of whom had longitudinal screening data from prior hospitalization. Nasal specimens for MRSA, perirectal specimens for VRE, and permanent catheter exit site specimens were collected. RESULTS: MRSA colonization was present in 5.6% and VRE colonization in 3.14%. Univariate analyses revealed that prior exposure (defined as infection/colonization) with MRSA, hospitalization, and low serum albumin were associated with MRSA colonization. VRE colonization was associated with hospitalization, prior VRE or MRSA exposure, low serum albumin, and low ferritin. Multivariate analyses revealed MRSA colonization was predicted by prior MRSA exposure and VRE colonization was predicted by prior VRE exposure and number of hospitalizations. Among the 75 participants with longitudinal screening data, MRSA colonization was associated with prior MRSA history, and VRE colonization was associated with prior MRSA or VRE. CONCLUSIONS: Generally low rates of MRSA and VRE colonization were observed in hemodialysis outpatients. Prior hospital screening was predictive of future outpatient colonization and may be useful in risk assessment.

Hain, D. J. (2008). "Cognitive function and adherence of older adults undergoing hemodialysis." Nephrol Nurs J 35(1): 23-9.

As the number of older adults undergoing hemodialysis increases, it is important for nurses to consider cognitive impairment as a contributing factor to non-adherence. The purpose of this exploratory study was to identify cognitive markers that nurses can use to alert them to potential problems with adherence among older adults undergoing hemodialysis. Stories of the health challenge of making lifestyle change were analyzed with a linguistic analysis software program. A standardized instrument (3MS) that measures global cognitive function was administered. Determination of adherence level was the last activity of data collection. In this sample (n=63),

39.7% of the participants had evidence of cognitive impairment (3MS score less than 80); 58.2% of the 39.7% had evidence of non-adherence. There was a significant relationship between word use and cognitive function (p < .01). Cognitive impairment is prevalent among older adults undergoing hemodialysis and words might be a proxy for recognizing this.

Haskal, Z. J. and J. Radhakrishnan (2008). "Transjugular intrahepatic portosystemic shunts in hemodialysis-dependent patients and patients with advanced renal insufficiency: safety, caution, and encephalopathy." J Vasc Interv Radiol 19(4): 516-20.

PURPOSE: To retrospectively determine the acute safety and chronic outcomes of transjugular intrahepatic portosystemic shunt (TIPS) creation in patients with hemodialysis-dependent end-stage renal disease for control of bleeding and refractory ascites. MATERIALS AND METHODS: Four dialysis-dependent patients and one renal transplant recipient (glomerular filtration rate, 27 mL/min) underwent TIPS creation for treatment of refractory ascites (n = 3) and recurrent portal hypertensive bleeding (n = 1). A sixth patient developed unrelated renal failure 3 years after initial TIPS formation and presented with encephalopathy at that time. All had nearly normal liver function test results and no previous baseline encephalopathy. Three dialysis recipients underwent dialysis immediately after the TIPS procedure in an intensive care unit; one did not. RESULTS: There were no complications of fluid overload or pulmonary edema after TIPS creation in the patients who immediately underwent dialysis. The one patient in whom dialysis was delayed developed respiratory failure and shock liver (ie, ischemic hepatitis). Ascites resolved in all three patients, and no recurrent variceal bleeding occurred during a mean follow-up of 17 months. Severe, grade 2-4 hepatic encephalopathy developed in all patients; in one patient, its onset was delayed until the onset of renal failure 3 years after the original TIPS procedure. Shunt reduction was required in four cases and competitive variceal embolization was required in one to reduce portosystemic diversion. No less than grade 1 episodic baseline encephalopathy was present in all patients despite continued use of the maximum prescribed medical therapy thereafter. CONCLUSIONS: TIPS creation is effective in controlling ascites and bleeding in functionally anephric patients, but at the cost of marked and disproportionate hepatic encephalopathy. Prompt, acute postprocedural dialysis and fluid management is critical for safe creation of a TIPS in dialysis-dependent patients.

Hayslip, D. (2008). "Revisions in the prescribing information for Epoetin alfa: implications for nephrology nurses and patients on dialysis." Nephrol Nurs J 35(2): 163-7.

The prescribing information for Epoetin alfa administered to patients with chronic renal failure (CRF) or cancer was updated in November 2007. The revisions include revised safety information, new Epoetin alfa dosing recommendations, and revised information on health-related quality of life (HRQoL). The most significant changes included revision of the box warning, the reinstatement of a hemoglobin (Hb) range of 10 to 12 g/dL for patients with chronic renal failure, a new section on managing patients with hyporesponse to Epoetin alfa, and updated HRQoL data. These changes may necessitate revisions in anemia management protocols for patients with CRF, as well as changes in how nurses and other members of the nephrology team educate patients on the risks and benefits of Epoetin alfa therapy. Nurses will play a key role in assessing trends in laboratory values, predicting the course of Hb, and enacting appropriate physician-prescribed interventions to ensure adherence to the revised prescribing information.

Hoban, V. (2008). "Using teamwork to fight infection." Nurs Times 104(16): 18-9.

Hoenich, N., S. Thijssen, et al. (2008). "Impact of water quality and dialysis fluid composition on dialysis practice." Blood Purif 26(1): 6-11.

An essential but frequently neglected aspect of dialysis treatment is the dialysis fluid produced by blending treated tap water with concentrated solutions containing electrolytes and buffer. Chemical and microbiological contaminants as well as the electrolyte and buffer composition of the dialysis fluid play major roles in the induction or modulation of morbidity associated with regular dialysis therapy.

Hoenich, N. A. and R. Levin (2008). "Water treatment for dialysis: technology and clinical implications." Contrib Nephrol 161: 1-6.

The dialytic process utilizes high volumes of water in the preparation of the dialysis fluid. Improvements in water treatment equipment have resulted in improvements in chemical quality. Awareness that endotoxin and bacterial fragments present in the water distribution loop within the dialysis, are able to cross the dialyser membrane, has resulted in an increased focus on this aspect of water quality. Practically, the age of many water treatment plants, extensions of distribution systems and suboptimal cleaning procedures have prevented the achievement of optimal microbiological quality on a routine basis. When achieved and maintained, clear benefits to the patient have been demonstrated. Hemodialysis patients are also subject to increased oxidative stress which may also contribute to their morbidity and mortality. Recent clinical studies using dialysis fluid made with electrolytereduced water have demonstrated benefits to antioxidant status of dialysis patients, offering a further technological solution to the problem of increased cardiovascular disease in dialysis patients.

Holley, J. L. (2006). "A descriptive report of errors and adverse events in chronic hemodialysis units." Nephrol News Issues 20(12): 57-8, 60-1, 63 passim.

With the combination of technical equipment, medication administration, and caregiver-delivered treatment, opportunities for adverse events and medical errors exist in hemodialysis units.There are no studies describing the type and frequency of medical errors and adverse events in hemodialysis units. This study examines standard adverse events and medical errors reported on routine quality assurance forms by the clinical directors of four hemodialysis units between January 2004 and June 2005.The units varied in size (45 -108 patients), average number of hemodialysis treatments provided (524 -1,333/month), and staffing ratios (1:3 - 1:9.5). In total, 88 errors occurred in 64,541 dialysis treatments (1 event every 733 treatments). Infiltration of the hemodialysis access (n = 31 ) and clotting of the dialysis circuit (n = 19) were also fairly common while dialysis equipment problems occurred relatively rarely (30 occurrences in 64,541 treatments, or 1 event every 2,151 treatments). Thirty-five medication errors occurred (1 every 2,15 1 treatments); omission of an ordered medication was the most common (24/35, 69%). Nine patients fell and six of the falls occurred after a dialysis treatment. No patients required hospitalization as a result of the adverse events or errors. Errors and events were more common in the larger units but did not seem to be directly related to unit staffing ratios. Adverse events in hemodialysis units are fairly common and should be included among routine quality improvement issues addressed by dialysis providers and caregivers. More study of this issue is needed.

Holtby, M. A. (2007). "Know how it works before you fix it: a data analysis strategy from an inpatient nephrology patient-flow improvement project." CANNT J 17(1): 30-6.

This article describes a two-part data analysis strategy that was used as part of a process improvement project on an inpatient renal unit. The goal of the project was to improve patient flow-through from admission to discharge. The Canadian Institute for Health Information reported that the proportion of incident end stage renal disease in the 65+ age group was on the rise, and that the fastest growing segment of incident dialysis patients was in the 75+ age group. Health professionals who provide hospital services to nephrology patients should be alert to this information and anticipate longer mean lengths of hospital stay and more frequent discharge delays. There has been no research in this area specific to inpatient renal units. The author shares his data analysis strategy in hopes that it will spur more research and other process improvement projects.

Hotchkiss, J. R., P. Holley, et al. (2007). "Analyzing pathogen transmission in the dialysis unit: time for a (schedule) change?" Clin J Am Soc Nephrol 2(6): 1176-85.

BACKGROUND AND OBJECTIVES: Infectious diseases and antimicrobial-resistant microorganisms are a growing problem for the dialysis population. The frequency of patient visits and intimate, prolonged physical contact with the inanimate environment during dialysis treatments make these facilities potentially efficient venues for nosocomial pathogen transmission. Isolation measures and infection control practices can be inconvenient and consume limited resources. Quantitative tools for analyzing the effects of different containment strategies can help to identify optimal strategies for further study. However, spatial and temporal considerations germane to the dialysis unit greatly complicate analyses relying on conventional mathematical approaches. DESIGN, SETTING, PARTICIPANTS, & MEASUREMENTS: A stochastic, individual-based, Monte Carlo simulation tool that predicts the effects of various infection control strategies on pathogen dissemination through the dialysis unit in the face of diagnostic uncertainty was developed. The model was configured to emulate a medium-sized dialysis unit. The predicted consequences of various policies for scheduling patients who were suspected of being infectious were then explored, using literature-based estimates of pathogen transmissibility, prevalence, and diagnostic uncertainty. RESULTS: Environmental decontamination was predicted to be of paramount importance in limiting pathogen dissemination. Temporal segregation (scheduling patients who were suspected of being infectious to dialysis shifts that are later in the day) was predicted to have the greatest effectiveness in reducing transmission, given adequate environmental decontamination between successive days. CONCLUSIONS: Decontamination of the patient's environment (chair) can markedly attenuate pathogen dissemination. Temporal segregation could be a simple, low-cost, system-level intervention with significant potential to reduce nosocomial transmission in the dialysis unit.

Houck, C. M., R. J. Pristave, et al. (2008). "Nephrogenic systemic fibrosis and gadolinium-based contrast: medico-legal implications." Semin Dial 21(2): 166-70.

The epidemiologic link between exposure to gadolinium-based contrast (GBC) agents and the development of nephrogenic systemic fibrosis (NSF) in patients with moderate to severe end-stage renal disease (ESRD) has caused concern among physicians, particularly radiologists and nephrologists. The concerns of manufacturers of GBC agents and the U.S. Food and Drug Administration (FDA) have led to the publication of product label warnings and a Public Health Advisory. As more cases of NSF associated with GBC agent exposure have surfaced, manufacturers and physicians have become increasingly concerned about the potential for litigation.

To date, litigation has been directed primarily at manufacturers of GBC agents and has focused on package warnings. Thus, physicians should stay abreast of FDA warnings, keep an open line of communication with manufacturers of GBC agents, and review package warnings.

Hsu, Y. H., M. C. Huang, et al. (2006). "Pseudomyxoma peritonei as a cause of culture-negative peritonitis for a patient undergoing peritoneal dialysis." Am J Kidney Dis 47(5): 905-7.

Culture-negative peritonitis accounts for up to 20% of all peritoneal dialysis-related peritonitis, the causes of which include culture-associated technical errors, prior use of antibiotics, infection caused by certain unusual or fastidious microorganisms, the development of abdominal or retroperitoneal organ inflammation, and the presence of malignancies. Here, we report a patient with end-stage renal disease receiving peritoneal dialysis who presented with culture-negative peritonitis and ultrafiltration failure caused by the rare pseudomyxoma peritonei. For cases of culture-negative peritonitis such as this, early imaging studies may help recognize intraperitoneal/retroperitoneal visceral inflammation and malignant conditions.

Hussein, M. M., J. M. Mooij, et al. (2007). "The impact of polymerase chain reaction assays for the detection of hepatitis C virus infection in a hemodialysis unit." Saudi J Kidney Dis Transpl 18(1): 107-13.

Hepatitis C virus (HCV) infection is most often diagnosed by detection of antibodies against the virus (HCV Ab). However, it has been reported that some HCV Ab negative patients test positive for HCV-RNA. Over a study period of 30 months, all patients on hemodialysis at the Al Hada Armed Forces Hospital in Taif, Saudi Arabia were tested monthly for HCV Ab and twice per year for HCV-RNA. HCV Ab was tested by a third generation microparticle enzyme immunoassay (MEIA), and HCV-RNA by a qualitative hepatitis-RNA assay, second version (COBAS Amplicor PCR), which was recently introduced in the Molecular Pathology Laboratory of our hospital. Of the 180 patients studied, 34 (18.9%) had positive HCV Ab, and of the 146 HCV Ab negative patients, five patients tested positive for HCV-RNA (3.42%). Our study further finds that, when applying HCV Ab testing only, some patients with HCV viremia may be undetected. For better HCV infection control, routine HCV-RNA testing of dialysis patients should be considered, particularly in areas where the infection is common and in units applying isolation policies.

Johnson, S. and A. Dwyer (2008). "Patient perceived barriers to treatment of depression and anxiety in hemodialysis patients." Clin Nephrol 69(3): 201-6.

Untreated psychiatric illness correlates with increased mortality, reduced quality of life and increased risk of suicide in renal failure patients, but little is known about why these patients fail to seek mental health care. The purpose of this study was to identify the perceived barriers to mental health services in the hemodialysis patient population. The Beck Depression Inventory (BDI) and Beck Anxiety Inventory (BAI) were used to identify the prevalence and severity of depression and anxiety in a group of 179 hemodialysis patients. Of the 103 patients who completed the surveys, 73.8% were African-American and 62.1% were male. Of the 54.4% of patients identified with depression by scoring 10 or greater on the BDI, 34.0% had mild-to-moderate, 12.6% had moderate-to-severe, and 7.8% had severe depression. Only 13.6% of respondents met criteria for anxiety. Each patient was asked to choose from a list of possible barriers, and 71.4% of patients meeting criteria for depression or anxiety identified a barrier to mental health treatment. Of these, over 70% of patients were unaware of symptoms of depression/ anxiety or did not perceive the need for help. Our results indicate a high prevalence of untreated depression in hemodialysis patients. Patient

perceptions of the need for therapy present the most significant barriers to identification and treatment.

Kamikawa, S., T. Sugimoto, et al. (2008). "Pharmacokinetic study of interleukin-2 following intravenous injection in hemodialysis patients with renal cell carcinoma." Ther Apher Dial 12(1): 67-71.

The purpose of the present study is to determine the change in blood concentration of interleukin-2 (IL-2) after intravenous injection in hemodialysis patients and to assess its safety. Four hemodialysis patients who underwent nephrectomy due to renal cell carcinoma were treated with IL-2 at a dose of 350 000-700 000 JRU by intravenous injection. Pharmacokinetic parameters were analyzed from the serum IL-2 concentration, which reached its peak just after the end of infusion, followed by biphasic elimination, and was below the detection limit in all patients at 24 h postinfusion. In comparison with patients with normal renal function, the volume of distribution in the serum compartment was almost comparable (3820 +/- 2020 mL). Clearance (50.47 +/- 11.50 mL/min) decreased to 40%, and the half-life of the distribution phase (0.45 +/- 0.19 h) and that of the terminal phase (1.72 +/- 0.20 h) were distinctly longer. The area under the blood concentration-time curve was about two-fold higher than that of non-hemodialysis patients. In all patients, there were no serious adverse reactions. The results of the present study suggest that intravenous IL-2 therapy can be safely performed in hemodialysis patients.

Kammerer, J., G. Garry, et al. (2007). "Adherence in patients on dialysis: strategies for success." Nephrol Nurs J 34(5): 479-86.

Adherence is a major problem in patients with chronic kidney disease. Patients can be nonadherent with different aspects of their treatment, which includes medications, treatment regimens, and dietary and fluid restrictions. Although many lessons have been learned from adherence research, the evidence of how to modify adherence is somewhat mixed. To minimize nonadherence, interventions need to focus on both patient factors and the extent to which relationships and system problems compromise the patient's ability to adhere to medication and treatment plans. There continues to be a tendency to focus on the patient as the reason for problems with adherence, ignoring other factors such as the patient-health care provider relationships and the health care system that surrounds the patient. These latter factors can have a considerable effect on adherence. The nurse can develop a strong relationship of support with the patient, identify barriers, and offer strategies to help patients improve adherence.

Kamohara, K., M. Yoshikai, et al. (2007). "Safety of perioperative hemodialysis and continuous hemodiafiltration for dialysis patients with cardiac surgery." Gen Thorac Cardiovasc Surg 55(2): 43-9.

OBJECTIVE: We have routinely used postoperative continuous hemodiafiltration (CHDF) combined with intraoperative hemodialysis (IHD) for dialysis patients undergoing open-heart surgery. This perioperative management could avoid any limitation of potassium concentration in the cardioplegic solution, strict restriction of fluid administration, or blood transfusion. METHODS: To evaluate the safety of this strategy, 22 dialysis patients who underwent open-heart surgery (Dialysis Group) were retrospectively compared with 30 patients with normal renal function selected from the same time period with rigorously matched clinical characteristics such as age, gender, and operative procedures (Matched Group). RESULTS: No significant difference was found in the operative variables such as the operative procedures, cardiopulmonary bypass time,

and aortic cross-clamp time in both groups. There were two deaths (9.1%) in the Dialysis Group compared with Matched Group (0%). In the Dialysis Group, the levels of serum potassium and creatinine were well controlled in the perioperative period with a mean duration of IHD and CHDF of 243.7 +/- 60.6 min and 2.7 +/- 1.1 days, respectively. In particular, no significant difference between intraoperative and postoperative levels of serum potassium was observed in the Dialysis Group (P = 0.09), whereas there was a significant increase in the Matched Group (P = 0.004). Mean volume administered for the first 24 h after surgery was not different from the Matched Group. There were no vascular access-related complications in the Dialysis Group. CONCLUSIONS: Postoperative CHDF combined with IHD can provide a similar management protocol for dialysis patients compared to patients with normal renal function.

Kara, B., K. Caglar, et al. (2007). "Nonadherence with diet and fluid restrictions and perceived social support in patients receiving hemodialysis." J Nurs Scholarsh 39(3): 243-8.

PURPOSE: To describe nonadherence with diet and fluid restrictions and the level of perceived social support in hemodialysis patients. DESIGN: Descriptive survey. The data were obtained from 160 patients in three hemodialysis centers in Turkey between March 2006 and May 2006. Descriptive statistics, reliability analysis, correlations, and logistic regression analysis were conducted. METHODS: Data were collected by using a personal data form, the Dialysis Diet and Fluid Nonadherence Questionnaire, and the Multidimensional Scale of Perceived Social Support. RESULTS: Most patients showed nonadherence with diet and fluid restrictions. Family members were important providers of social support for patients. Significant factors affecting fluid nonadherence included age, marital status, and family and friend support. Marital status and family support were also the main variables affecting diet nonadherence. CONCLUSIONS: The results of this study showed that nonadherence was more common among younger, married patients, and those with lower levels of perceived social support.

Karamanidou, C., J. Clatworthy, et al. (2008). "A systematic review of the prevalence and determinants of nonadherence to phosphate binding medication in patients with end-stage renal disease." BMC Nephrol 9: 2.

BACKGROUND: Cardiovascular events are the leading cause of death in end stage renal disease (ESRD). Adherence to phosphate binding medication plays a vital role in reducing serum phosphorus and associated cardiovascular risk. This poses a challenge for patients as the regimen is often complex and there may be no noticeable impact of adherence on symptoms. There is a need to establish the level of nonadherence to phosphate binding medication in renal dialysis patients and identify the factors associated with it. METHODS: The online databases PsycINFO, Medline, Embase and CINAHL were searched for quantitative studies exploring predictors of nonadherence to phosphate binding medication in ESRD. Rates and predictors of nonadherence were extracted from the papers. RESULTS: Thirty four studies met the inclusion criteria. There was wide variation in reported rates of non-adherence (22-74% patients nonadherent, mean 51%). This can be partially attributed to differences in the way adherence has been defined and measured. Demographic and clinical predictors of nonadherence were most frequently assessed but only younger age was consistently associated with nonadherence. In contrast psychosocial variables (e.g. patients' beliefs about medication, social support, personality characteristics) were less frequently assessed but were more likely to be associated with nonadherence. CONCLUSION: Nonadherence to phosphate binding medication appears to be prevalent in ESRD. Several potentially modifiable psychosocial factors were identified as predictors of nonadherence. There is a need for further, high-quality

research to explore these factors in more detail, with the aim of informing the design of an intervention to facilitate adherence.

Karamanidou, C., J. Weinman, et al. (2008). "Improving haemodialysis patients' understanding of phosphate-binding medication: a pilot study of a psycho-educational intervention designed to change patients' perceptions of the problem and treatment." Br J Health Psychol 13(Pt 2): 205-14.

OBJECTIVES: To evaluate a psycho-educational intervention aimed to improve understanding of the need for phosphate control, provide a rationale for phosphate-binding medication (PBM) and explain its mode of action. DESIGN: A controlled intervention study comparing the effect of a self-regulatory theory-based psycho-educational intervention versus standard care control on knowledge of phosphate control and beliefs about PBM. METHOD: End-stage renal disease (ESRD) patients were assigned to either an intervention group (N=19) or control group (N=20). Both groups were assessed at baseline, at 1-month post-intervention and at 4-month post-intervention. The intervention group was also assessed immediately post-intervention. RESULTS: The intervention had an immediate impact post-intervention on all outcome variables examined. It was also successful in improving knowledge, treatment coherence, medication outcome efficacy beliefs, and general understanding of treatment in the intervention group in comparison to the control group, an effect which was sustained through to the second follow-up. CONCLUSIONS: A simple intervention was successful in changing patients' understanding and some beliefs around treatment thought to influence adherence behaviour. Further research is needed to inform the design of a more complex intervention targeting the specific beliefs influencing behaviour in order to facilitate treatment adherence.

Katneni, R. and S. S. Hedayati (2007). "Central venous catheter-related bacteremia in chronic hemodialysis patients: epidemiology and evidence-based management." Nat Clin Pract Nephrol 3(5): 256-66.

Central venous catheter-related blood stream infection (CRBSI) is a major cause of morbidity and mortality in patients with end-stage renal disease treated with chronic hemodialysis. Risk factors include Staphylococcus aureus nasal colonization, longer duration of catheter use, previous bacteremia, older age, higher total intravenous iron dose, lower hemoglobin and serum albumin levels, diabetes mellitus and recent hospitalization. Symptoms that raise clinical suspicion of bacteremia in chronic hemodialysis patients are fevers and chills. When CRBSI is suspected, blood cultures should be obtained and empirical therapy with broad spectrum intravenous antibiotics initiated. The diagnosis of CRBSI is confirmed by isolation of the same microorganism from quantitative cultures of both the catheter and the peripheral blood of a patient that has clinical features of infection without any other apparent source. Gram-positive cocci, predominantly S. epidermidis and S. aureus, cause bacteremia in two-thirds of cases. Among the various approaches to management of CRBSI, removal and delayed replacement of the catheter, catheter exchange over a guidewire in selected patients, and the use of antimicrobial/citrate lock solutions have all been found to be promising for treatment and/or prevention; however, resolution of issues regarding selection, dose, duration and emergence of antibiotic-resistant organisms with chronic use of antibiotic lock solutions, as well as the safety of long-term use of trisodium citrate lock solutions, await further randomized, multicenter trials involving larger samples of hemodialysis patients.

Klevens, R. M., J. R. Edwards, et al. (2008). "Dialysis Surveillance Report: National Healthcare Safety Network (NHSN)-data summary for 2006." Semin Dial 21(1): 24-8.

Thirty-two outpatient hemodialysis providers in the United States voluntarily reported 3699 adverse events to the Centers for Disease Control and Prevention (CDC) National Healthcare Safety Network (NHSN) during 2006. These providers were previously enrolled in the Dialysis Surveillance Network. The pooled mean rates of hospitalization among patients with arteriovenous fistulas, grafts, permanent and temporary central venous catheters were 7.7, 9.2, 15.7, and 34.7 per 100 patient-months, respectively. For bloodstream infection the pooled mean rates were 0.5, 0.9, 4.2, and 27.1 per 100 patient-months in these groups. Among the 599 isolates reported, 461 (77%) represented access-associated blood stream infections in patients with central lines, and 138 (23%) were in patients with fistulas or grafts. The microorganisms most frequently identified were common skin contaminants (e.g., coagulase-negative staphylococci). In 2007, enrollment in NHSN opened to all providers of outpatient hemodialysis. Specific information is available at http://www.cdc.gov/ncidod/dhqp/nhsn_FAQenrollment.html.

Kliger, A. S. (2007). "The dialysis medical director's role in quality and safety." Semin Dial 20(3): 261-4.

The medical director of dialysis is responsible for leadership in a dialysis facility's quality improvement activities and patient safety initiatives. The Director should have knowledge of, and an ability to utilize, Continuous Quality Improvement techniques, evidence-based guidelines, standardized mortality, hospitalization and transplantation data and other modalities to improve systems of care.

Kopelman, R. C., L. Smith, et al. (2007). "Functional iron deficiency in hemodialysis patients with high ferritin." Hemodial Int 11(2): 238-46.

Although functional iron deficiency (FID) may be present in hemodialysis (HD) patients with high serum ferritin levels (>800 ng/mL), current protocols often preclude the use of intravenous (IV) iron in these patients. However, it has not been demonstrated that iron supplementation during erythropoietin therapy is ineffective or unsafe in increasing hemoglobin (Hb) levels in patients with high serum ferritin. This report describes the hematologic efficacy and safety of ferric gluconate (FG) therapy in patients with serum ferritin >800 ng/mL. A retrospective analysis was performed on HD patients at a single California dialysis center from January 1 to December 31, 2003. Patients classified as having high ferritin levels (serum ferritin >800 ng/mL on at least 66% of routine monthly measurements and transferrin saturation [TSAT] <25% on at least 1 occasion) were stratified as follows: patients in Group I were suspected of having FID and received FG > or =250 mg IV over a 3-month period when Hb was <11 g/dL, and patients in Group II were thought not to have FID and received <250 mg FG over a 3-month period. Both groups received standard recombinant human erythropoietin therapy as per the unit's protocol. Of 496 patients, 95 exhibited high ferritin and of these, 39 patients had sufficient data for analysis. Group I patients (n=14) showed a significant increase in Hb levels compared with Group II (n=25). There was no increase in ferritin levels in response to iron administration. No significant differences in hospitalizations or infections were observed between groups. Hemodialysis patients with high ferritin levels may have FID, and IV iron therapy safely improves FID in some patients. A larger randomized trial examining the optimal management of iron administration in HD patients with high ferritin levels is warranted.

Kopp, J. B., L. K. Ball, et al. (2007). "Kidney patient care in disasters: emergency planning for patients and dialysis facilities." Clin J Am Soc Nephrol 2(4): 825-38.

The catastrophic 2005 hurricane season alerted Americans to the need for a more effective response to mass casualty incidents. To address the needs of the nephrology community, the Kidney Community Emergency Response Coalition (KCERC) was formed, with representatives from more than 50 governmental agencies and private organizations. After completing phase 1 of its work, the KCERC issued recommendations for patients, dialysis units, and providers. During phase 2, the KCERC will promote implementation of those recommendations. During a disaster, the KCERC will host a daily conference call on which dialysis facilities, the End-Stage Renal Disease Networks, and emergency response officials will coordinate disaster response. Predisaster preparation for kidney patients should stress identification of alternative dialysis facilities, education about the renal emergency diet, and plans for early evacuation from the disaster area and for evacuating with medical documents and medications. Dialysis facilities are required to have a disaster plan; regular revision and rehearsal are essential. Critical issues for dialysis facilities include identification of partner facilities, a robust communications plan that takes into account the limitations of telephones and broadband access, staff shortages in the face of a possible influx of new patients, the delivery of service in the face of compromised utilities (water, power), and the recovery of a dialysis facility that experiences flooding or structural damage. A timeline to safety for dialysis patients can be visualized; if specific tasks are accomplished at each disaster stage, then it is likely that the health of these vulnerable patients can be protected.

Korzets, A., O. Azoulay, et al. (2008). "The use of intradialytic parenteral nutrition in acutely ill haemodialysed patients." J Ren Care 34(1): 14-8.

BACKGROUND: Protein/caloric malnutrition is a problem in chronically haemodialysed patients, and is an independent risk factor for increased mortality in these patients. OBJECTIVES: To assess the safety and efficiency of intradialytic parenteral nutritional (IDPN) as nutritional support in acutely ill haemodialysis patients. METHODS: Twenty-two haemodialysis patients received IDPN after either major surgical or medical illnesses. Parameters measured included possible complications of IDPN, dialysis adequacy, patients' weight, protein catabolic rate (PCR) and serum levels of albumin, pre-albumin, creatinine, cholesterol, c-reactive protein (c-RP) and haemoglobin. After the end of the study all patients were followed-up for a further 6 months. RESULTS: Patients received IDPN for 1.5-48 months. Eighteen patients received IDPN <6 months. IDPN was safe for all patients. Throughout this period dialysis remained adequate. Weight loss in all patients ceased after approximately 2 months of IDPN. PRC, serum albumin, pre-albumin, cholesterol and creatinine levels all increased significantly. c-RP dropped from 77+/-86 mg/l to 9+/-10 mg/l. CONCLUSIONS: IDPN can be safely used in haemodialysed patients who are acutely ill and are unable to meet daily nutritional requirements with an oral intake. All studied parameters of nutrition and inflammation improved significantly while patients were treated with IDPN.

Kraemer, M. (2006). "Physiological monitoring and control in hemodialysis: state of the art and outlook." Expert Rev Med Devices 3(5): 617-34.

Medical devices for monitoring and feedback control of physiological parameters of the dialysis patient were introduced in the early 1990s. They have a wide range of applications, aiming at increasing the safety and ensuring the efficiency of the treatment, and at an improved restoration of physiological conditions, leading to an overall reduction in morbidity and mortality. Such devices include sensors for the measurement of temperature, optical parameters and sound speed in blood, and electrical characteristics of the human body, and other parameters. Essential for the development of these devices is a detailed understanding of the pathophysiological background of a therapeutical problem. There is still a large potential to introduce new devices for further therapy improvement and automation. Also, the size of the hemodialysis market appears attractive; however, a new product has to meet several specific requirements in order to also become commercially successful. This review describes the therapeutic and technical principles of several available devices, reports on concepts for possible future devices, and presents a short overview on the market environment.

Labriola, L., R. Crott, et al. (2008). "Preventing haemodialysis catheter-related bacteraemia with an antimicrobial lock solution: a meta-analysis of prospective randomized trials." Nephrol Dial Transplant 23(5): 1666-72.

BACKGROUND: Catheter-related bacteraemia (CRB) is a major cause of morbidity and mortality in haemodialysis patients. Interdialytic locking of catheters with antimicrobial agents has recently been investigated for the prevention of CRB. We performed a meta-analysis of randomized controlled trials (RCT) to determine the efficacy of antimicrobial lock solutions (ALS) in the prevention of CRB in haemodialysis patients. METHODS: We collected from Medline, Web of Science, the Cochrane Library and major nephrology journals, all relevant references (January 1990-March 2007). We selected RCT comparing an ALS to a standard heparin lock in CRB prevention. We extracted data concerning study quality, patient characteristics and CRB incidence. The relative risk (RR) of CRB was calculated as Ln (CRB incidence control/CRB incidence experimental) using both a fixed- and a random-effects model. RESULTS: Eight studies were included, involving 829 patients, 882 catheters and 90 191 catheter-days. The use of an ALS significantly decreased the risk of CRB (RR 0.32; 95% CI 0.10-0.42). Borderline heterogeneity was observed in the fixed-effects model (Q = 14.42; P = 0.071). Despite the under-representation of small negative studies, the high number of additional trials necessary to reverse the final effect strengthens the confidence in the overall results. Subgroup analyses stratified by the presence of diabetes, duration of follow-up, biochemical markers, proportion of tunnelled cuffed catheters, intranasal mupirocin use and citrate use in the ALS did not show significant differences, except a higher efficacy of gentamicin-containing lock solutions (P = 0.003). CONCLUSIONS: The use of ALS reduces by about a factor 3 the risk of CRB in haemodialysis patients. The achieved absolute incidence is similar to the best-published figures (presumably related to stricter hygienic measures). The limited follow-up of the studies does not exclude the onset of adverse events or bacterial resistance with longer use of ALS.

Larson, K. (2008). "IV iron use in patients with higher serum ferritin: case study on anemia in kidney disease." Nephrol Nurs J 35(2): 184-93; quiz 194-5.

Anemia management practices in patients on hemodialysis that incorporate a balanced approach to erythropoiesis-stimulating agent (ESA) and intravenous (IV) iron therapy, use the lowest effective dose of ESA, and provide IV iron therapy in patients with higher serum ferritin levels have become important treatment considerations. This case study, followed by an indepth discussion, addresses these issues and helps to identify safe and effective treatment strategies to assist nurses in improving patient outcomes.

Ledebo, I. (2007). "Ultrapure dialysis fluid--how pure is it and do we need it?" Nephrol Dial Transplant 22(1): 20-3.

Lehoux, P., G. Daudelin, et al. (2007). "Designing a better place for patients: professional struggles surrounding satellite and mobile dialysis units." Soc Sci Med 65(7): 1536-48.

The professional claims and struggles involved in the design of non-traditional health care places are rarely problematized in applied health research, perhaps because they tend to fade away once the new design is implemented. This paper offers insights into such professional tensions and their impact on health care delivery by examining the design of two dialysis service delivery models in Quebec, Canada. The satellite units were hosted in two small hospitals and staffed by recently trained nurses. The mobile unit was a bus fitted to accommodate five dialysis stations. It was staffed by experienced nurses and travelled back and forth between a university teaching hospital and two sites. In both projects, nephrologists supervised from a distance via a videoconferencing system. In this paper, we draw mainly from interviews with managers (mostly nurses) and physicians (n=18), and from on-site observations. Nephrologists, medical internists, and managers all supported the goal of providing "closer-to-patient" services. However, they held varying opinions on how to best materialize this goal. By comparing two models involving different clinical and spatial logics, we underscore the ways in which the design of non-traditional health care places opens up space for the re-negotiation of clinical norms. Instead of relatively straightforward conflicts between professions, we observed subtle but inexorable tensions within and beyond professional groups, who sought to measure up to "ideal standards" while acknowledging the contingencies of health care places.

Lenz, O., S. Sadhu, et al. (2006). "Overutilization of central venous catheters in incident hemodialysis patients: reasons and potential resolution strategies." Semin Dial 19(6): 543-50.

Even after adjusting for comorbidities, the outcomes in hemodialysis (HD) patients using a central venous catheter (CVC) as dialysis access are worse than in those with a permanent vascular access. In spite of this, nationwide data suggest that only about 25% of incident HD patients initiate dialysis with an arteriovenous fistula. We conducted a retrospective study to identify reasons and resolution strategies for CVC use in patients who initiated HD at an academic medical center with a well-established chronic kidney disease (CKD) clinic and a dedicated vascular surgeon. Estimated glomerular filtration rate (eGFR) loss over time to record progression of patients to HD was also examined. The charts of 170 consecutive patients were reviewed. Ninety-two percent were found to initiate HD using a CVC. Three factors explained 93% of all CVC in our cohort: absence of adequate predialysis care (45%), acute illness with failure to recover from an episode of acute renal failure (31%), and patient's failure to adhere to scheduled clinic or surgical appointments (17%). In addition, analyses of eGFR suggest that the velocity of GFR loss rather than a defined degree of renal function might be a better trigger for vascular access referral. We conclude that early referral,

a close follow up of CKD patients who initiate dialysis due to acute illness, and patient education may have a positive impact to counteract overutilization of CVCs for dialysis. The rate in eGFR decline might also be used to calculate the referral time adequate for fistula creation.

Li, M., G. Tomlinson, et al. (2008). "Geriatric comorbidities, such as falls, confer an independent mortality risk to elderly dialysis patients." Nephrol Dial Transplant 23(4): 1396-400.

BACKGROUND: As the number of patients aged >/=65 years starting haemodialysis (HD) continues to increase, more patients are at risk of falls, functional decline and cognitive impairment. In an earlier prospective cohort study, we showed that 44% of elderly HD patients had more than one fall within a 1-year period. The objective of this study was to assess whether falls remained predictive of increased mortality risk even after controlling for age, comorbidity, dialysis vintage and laboratory variables. METHODS: Using a prospective, cohort study design, patients aged >/=65 years and on chronic HD during the period April 2002-2003 were recruited. Patients were followed biweekly, and falls occurring within the first year were recorded. Outcome data were collected until death, study end (30 December 2006), transplantation or transfer to another dialysis centre. RESULTS: A total of 162 patients were followed for a median of 32.7 months (quartiles 14-57). In a univariate Cox model with a time-dependent variable for falls status, survival was worse amongst fallers compared to non-fallers (HR 2.13, 95% CI 1.32-3.45; P = 0.002). After adjustment for age, dialysis vintage, comorbidity and laboratory variables, falls were a significant predictor of mortality (HR 1.78, 95% CI 1.07-2.98, P = 0.03). Exclusion of falls associated with concurrent illnesses did not alter the results (HR 1.63, CI 1.02-2.28 P = 0.05). CONCLUSIONS: We conclude that the occurrence of more than one accidental fall in a community-dwelling HD patient aged >/=65 years is associated with an independent increased risk of death. As fall interventions are effective, screening HD patients for falls may be a simple measure of clinical importance.

Lii, Y. C., S. L. Tsay, et al. (2007). "Group intervention to improve quality of life in haemodialysis patients." J Clin Nurs 16(11C): 268-75.

AIM AND OBJECTIVE: The purpose of this study was to investigate the effects of group intervention on depression, self-efficacy and quality of life in haemodialysis patients. BACKGROUND: Chronic renal failure and haemodialysis treatment is a long-term process; patients need to have an appropriate adaptive strategy to confront the stress stemming from the disease and subsequent haemodialysis treatment. The application of group intervention for haemodialysis patients has been limited. DESIGN: This study applied an experimental design methodology. Patients were selected at two haemodialysis units of major medical centres in northern Taiwan. METHODS: Out of 60 original patients randomly assigned into experimental or control groups, 48 completed the study. Twenty patients in the experimental group received group psychosocial intervention. The therapy ran for two hours per week for two months. Twenty-eight patients in the comparison group received routine unit care and a self-care booklet. Instruments included the Strategies Used by People to Promote Health, the Beck Depression Inventory and the Short Form-36. Data were collected at pretest and one month following the therapy. RESULTS: The findings demonstrated that self-care self-efficacy, depression and quality of life significantly improved statistically for patients in the therapy group, compared with patients in the comparison group. CONCLUSIONS: The study indicated that group psychosocial intervention significantly reduced depression, improved self-care self-efficacy and quality of life in haemodialysis patients. RELEVANCE TO CLINICAL PRACTICE: The present study was conducted with a group of

outpatients, did not require expensive resources and was not time intensive, making it a viable therapy, clinically suitable for haemodialysis patients.

Logan, S. M., M. Pelletier-Hibbert, et al. (2006). "Stressors and coping of in-hospital haemodialysis patients aged 65 years and over." J Adv Nurs 56(4): 382-91.

AIMS: This paper reports a study to identify the types of stressors experienced by in-hospital haemodialysis patients aged 65 years and older, and the use and perceived helpfulness of coping strategies to manage these stressors. BACKGROUND: Chronic renal failure and its treatments impose a variety of physical and psychosocial stressors, which challenge patients. Although the stressors and coping strategies of patients having dialysis treatment have been investigated, no study has specifically focused on older adults. Such investigation is important as the incidence of chronic kidney disease is increasing in this age group. METHOD: In this descriptive, correlational study, the Haemodialysis Stressor Scale and Jalowiec Coping Scale were used to investigate stressors and coping strategies reported by 50 in-hospital haemodialysis patients aged 65 years and older. The data were collected in Canada in 2004. RESULTS: Similar to previous research, the stressors of fatigue and fluid restrictions ranked highly as stressors in this sample. However, interference with social and recreational activities were stressors unique to this group. Findings challenge some common beliefs about haemodialysis patients. It is commonly believed that these patients 'get used to' haemodialysis, and therefore the number and troublesomeness of stressors decrease over time. This belief was not supported because length of time on haemodialysis did not affect participants' appraisal of stressors. Another major finding was that older participants in this sample reported the use of fewer coping strategies and found them less helpful. CONCLUSION: Further research is needed to investigate factors affecting the stressors and coping responses of older haemodialysis patients and to determine their impact on health outcomes. Such knowledge will assist nurses in developing age-appropriate strategies for promoting optimum wellness for these patients who will likely spend the remainder of their life adhering to the regimen of haemodialysis.

Lok, C. E. (2006). "Avoiding trouble down the line: the management and prevention of hemodialysis catheter-related infections." Adv Chronic Kidney Dis 13(3): 225-44.

Over the last 2 decades, hemodialysis catheter use has increased. Annually, approximately 30% of patients using a central venous catheter (CVC) experience a septic or bacteremic episode and are subsequently at risk of its associated long-term complications and mortality. Because of the serious clinical and financial impact of hemodialysis catheter-related bacteremias (HCRIs), standardized, validated definitions based on the hemodialysis patient population are necessary in order to better diagnose, monitor, and report HCRI for patient quality assurance and research purposes. The pathophysiology of HCRI involves a complex interaction between a triad that consists of the host patient, the infecting microorganism, and the vehicle catheter. Although the microorganism contribution in the pathogenesis of HCRI is likely most important, certain patient and catheter-related characteristics may be more amenable to manipulation. The key to managing HCRI is on prophylaxis against the initial microorganism catheter adherence and subsequent biofilm development. General and specific prophylactic maneuvers directed at both an intravascular and extraluminal route of microorganism entry are discussed including antibiotic- and silver-impregnated catheters and dressings, subcutaneous access devices, and topical prophylaxis at the exit site. In addition to systemic antibiotic use, the 3 methods of HRCI treatment using catheter salvage, guidewire exchange, and concurrent antibiotic lock are compared. The outcome and

complications of HCRI may be serious and highlight the importance of careful, continual infection surveillance. Although the use of a multidisciplinary hemodialysis infection control team is desirable, staffing education and physician feedback have been shown to improve adherence to infection control guidelines and reduce HCRI.

Lopes, A. A., S. J. Elder, et al. (2007). "Lack of appetite in haemodialysis patients--associations with patient characteristics, indicators of nutritional status and outcomes in the international DOPPS." Nephrol Dial Transplant 22(12): 3538-46.

BACKGROUND: Identification of haemodialysis patients with problems related to lack of appetite should help prevent adverse outcomes. We studied whether a single question about being bothered by lack of appetite within the prior 4 weeks is related to nutritional status, inflammation and risks of death and hospitalization. Additionally, we assessed associations of lack of appetite with depression, dialysis dose and length of haemodialysis. METHODS: This study is an analysis of baseline and longitudinal data from 14 406 patients enrolled in the Dialysis Outcomes and Practice Pattern Study. Cox regression was used to assess whether the degree (not, somewhat, moderately, very much, extremely) that patients were bothered by lack of appetite is an independent predictor of death and hospitalization. Logistic regression was used to identify baseline characteristics associated with being bothered by lack of appetite. RESULTS: The risk of death was more than 2-fold higher [relative risk (RR) = 2.23; 95% confidence interval (CI) = 1.90-2.62] and the risk of hospitalization 33% higher (RR = 1.33; 95% CI = 1.19-1.48) among patients extremely bothered, compared with not bothered, by lack of appetite. These associations followed a dose-response fashion and remained statistically significant after adjustments for 14 comorbidities. Depression, shorter haemodialysis session, hypoalbuminaemia, lower concentration of serum creatinine and normalized protein catabolic rate, lower body mass index and higher leucocyte and neutrophil counts were independently associated with higher odds of being bothered by lack of appetite. CONCLUSIONS: The data suggest that a single question about lack of appetite helps identify haemodialysis patients with poorer nutritional status, inflammation, depression and higher risks of hospitalization and death. The study calls attention to a possible beneficial effect of longer haemodialysis on appetite.

Maddux, F. W., D. W. Maddux, et al. (2008). "The role of the medical director: changing with the times." Semin Dial 21(1): 54-7.

The role of the dialysis unit Medical Director has evolved over time to an expanded set of roles from one that used to be strictly "medical" to one that is more "managerial." Physicians providing these Medical Director services are facing increasing demands for a leadership role regarding clinical quality improvement and measurement of performance in core areas of care within the dialysis program. The dialysis Medical Director is asked to lead in group decision-making, in analyzing core process and patient outcomes and in stimulating a team approach to Continuous Quality Improvement (CQI) and patient safety. For the end-stage renal disease program, national quality expectations in dialysis care have stimulated the dialysis providers to measure, report and respond consistently in an effort to provide a higher level of cost-efficient care. Medical Directors are usually contractually linked to the dialysis programs for which they provide oversight and their contracts are explicit about the relationship they maintain and the role they are expected to play within dialysis companies (often called "provider organizations"). The evolution of the Medical Director role has led to a close relationship between the company that provides the dialysis services and the physician providing the medical oversight.

Manias, E. and A. Williams (2007). "Communication between patients with chronic kidney disease and nurses about managing pain in the acute hospital setting." J Clin Nurs 16(11C): 358-67.

AIM: The aim of this paper is to examine communication between patients with chronic kidney disease and nurses about managing pain in the acute hospital setting. BACKGROUND: While pain often accompanies chronic kidney disease, little is known about managing pain in actual clinical practice. DESIGN: A single group, non-comparative design was used. METHODS: Research methods included observations and interviews to examine pain communication in all five adult renal units in the state of Victoria, Australia. A thematic approach was used to analyse the data. RESULTS: Observations and interviews were carried out with 14 nurses and 53 patients and 103 incidents of pain communication occurred during observations. Three themes were identified: complexity of pain, knowledge about pain management and contextual characteristics of the renal units. The nature of the patients' pain and effects of analgesics on the body shaped the complexity of pain in chronic kidney disease. Various causes of pain contributed to difficulties in management. Patients had acute pain from surgical procedures, in particular, phantom limb pain. They also had chronic pain arising from leg cramps, restless leg syndrome, and muscle and bone pain. Knowledge about pain management comprised the use of written resources about analgesics and information exchange among health professionals. Contextual characteristics involved the perceived urgency of pain communication and environmental stressors. CONCLUSIONS: The findings emphasize the need to capture dynamic processes of pain management in patients with chronic kidney disease to facilitate understandings about complex communication needs of this vulnerable group. RELEVANCE TO CLINICAL PRACTICE: Specific analgesic and non-pharmacological guidelines for patients with chronic kidney disease should be developed and made available in practice to facilitate effective pain management. Change champions of renal units are needed to support nurses in dedicating specified time for communicating with patients about managing pain.

Manierski, C. and A. Besarab (2006). "Antimicrobial locks: putting the lock on catheter infections." Adv Chronic Kidney Dis 13(3): 245-58.

Infectious complications resulting from catheter use in the hemodialysis population remain as the significant cause of morbidity and mortality in this patient population. Because conservation of vascular access sites remains a therapeutic mainstay for chronic hemodialysis patients, clinical investigators have evaluated the safety and efficacy of catheter preservation with antimicrobial lock solutions instilled into the lumens of catheters to treat and prevent infectious complications. The recommended treatment of catheter-related bacteremia includes administration of systemic antibiotics with catheter removal. To date, 4 studies in the hemodialysis population have evaluated the use of systemic antibiotics with an antimicrobial lock solution for treatment of catheter-related bacteremias to amplify the success of catheter salvage. The use of antimicrobial lock solutions for the treatment of catheter-related bacteremia has resulted in successful catheter salvage in approximately 69% of patients, with the remainder requiring catheter removal following a lack of clinical improvement after 48 hours. The antimicrobial lock has also been studied as a prophylactic measure to prevent catheter-related bacteremia. Six studies in the hemodialysis population have evaluated the use of an antimicrobial lock for the prevention of catheter-related bacteremia with an overall 64%-100% reduction in the frequency of catheter-related bacteremia. Although the use of antimicrobial lock for prophylaxis has demonstrated efficacy in clinical trials, its long-term consequences, including potential impact on antimicrobial resistance, are unknown. The objectives

of this review are to evaluate the current body of evidence espousing the utilization of an antimicrobial lock solution in tunneled cuffed and uncuffed catheters that are utilized during chronic intermittent hemodialysis.

Martin, K. J. (2007). "Epoetin delta in the management of renal anaemia: results of a 6-month study." Nephrol Dial Transplant 22(10): 3052-4.

BACKGROUND: Epoetin delta is an epoetin that, unlike existing agents, is produced in a human cell line. The present study investigated the efficacy and tolerability of intravenous (i.v.) epoetin delta compared with i.v. epoetin alfa. METHODS: This was a 6-month, multicentre, randomized, double-blind trial in haemodialysis patients previously receiving epoetin alfa. Haematological parameters were assessed, and adverse events monitored. Equivalent efficacy was defined as a difference in mean haemoglobin between the two agents over weeks 12-24 of < or = 1 g/dl with a 90% confidence interval (CI) within the range -1 to 1 g/dl. RESULTS: In total, 560 patients received epoetin delta while 192 received epoetin alfa, and 76.8% and 79.7% of patients, respectively, completed the study. Both agents showed similar efficacy in controlling anaemia: the point estimate for the difference in mean haemoglobin over weeks 12-24 was 0.01 g/dl (90% CI, -0.13, 0.15 g/dl), confirming equivalence. Adverse events were those expected in dialysis patients. Events possibly related to treatment occurred in 9.2% of patients receiving epoetin delta and 8.4% receiving epoetin alfa. Serious adverse events (SAEs) occurred in 33.0% and 26.7% of patients in the epoetin delta and epoetin alfa groups, respectively. Six patients in the epoetin delta group experienced an SAE considered possibly related to treatment (mostly access-related clotting), compared with no patient in the epoetin delta group. None of these SAEs were life threatening. CONCLUSIONS: Epoetin delta was shown to have an equivalent efficacy and safety profile to epoetin alfa in this 6-month study.

Micozkadioglu, H., I. Micozkadioglu, et al. (2006). "Relationship between depressive affect and malnutrition-inflammation complex syndrome in haemodialysis patients." Nephrology (Carlton) 11(6): 502-5.

BACKGROUND: Depression is associated with high mortality in haemodialysis (HD) patients, and can be associated with the poor oral intake that contributes to malnutrition. Malnutrition-inflammation complex syndrome (MICS) causes increased morbidity and mortality in HD patients. We investigated relationships between depressive affect, social support and various components of MICS in HD patients. METHODS: The subjects were 110 patients (65 men and 45 women, mean age 45.39 +/- 14.73 years) on maintenance HD. The Beck Depression Inventory (BDI), Cognitive Depression Index (CDI), and the Multidimensional Scale of Perceived Social Support (MSPSS) were used to assess aspects of depressive affect in each subject. RESULTS: The mean dialysis duration was 53.04 +/- 38.15 months. The mean BDI and CDI scores were 12.10 +/- 7.43 and 8.40 +/- 5.72, respectively. Patients were divided into two subgroups according to CDI score (depressive affect >10 (n = 71) and non-depressive affect <or=10 (n = 39)). CDI score was correlated with malnutrition-inflammation score (MIS) (r = 0.24; P < 0.05), haemoglobin level (r = -0.23; P < 0.05) and MSPSS score (r = -0.28; P < 0.01). The subgroup with depressive affect had higher MIS (P < 0.01) and lower social support (P = 0.001) than the non-depressive affect group. Logistic regression analysis identified high MIS and low MSPSS score as independent risk factor for depression. CONCLUSIONS: The results suggest that MIS and MSPSS

are the strongest predictors of depressive affect in HD patients. Further research is needed to understand the causal relationship between depressive affect and MICS in HD patients.

Moist, L. M., J. L. Bragg-Gresham, et al. (2008). "Travel time to dialysis as a predictor of health-related quality of life, adherence, and mortality: the Dialysis Outcomes and Practice Patterns Study (DOPPS)." Am J Kidney Dis 51(4): 641-50.

BACKGROUND: Longer travel time to the dialysis unit creates a substantial burden for many patients. This study evaluated the effect of self-reported 1-way travel time to hemodialysis on mortality, health-related quality of life (HR-QOL), adherence, withdrawal from dialysis therapy, hospitalization, and transplantation. STUDY DESIGN: Prospective observational cohort. SETTING & PARTICIPANTS: Patients enrolled in the Dialysis Outcomes and Practices Patterns Study who completed a patient questionnaire (n = 20,994). PREDICTOR: One-way travel time to hemodialysis treatment, categorized as 15 or less, 16 to 30, 31 to 60, and longer than 60 minutes. Covariates included demographics, comorbid conditions, serum albumin level, time on dialysis therapy, and country. OUTCOME & MEASUREMENT: HR-QOL was examined by using a linear mixed model. Cox proportional hazards regression was used to examine associations with mortality, withdrawal from dialysis therapy, hospitalization, and transplantation. RESULTS: Longer travel time was associated with greater adjusted relative risk (RR) of death (P = 0.05 for overall trend). Adjusted HR-QOL subscales were significantly lower for those with longer travel times compared with those traveling 15 minutes or less. There were no associations of travel time with withdrawal from dialysis therapy (P = 0.6), hospitalization (P = 0.4), or transplantation (P = 0.7). LIMITATIONS: The questionnaire nonresponse rate was substantial, and nonresponders were older, with more comorbid conditions. Travel time was assessed by using a single nonvalidated question. CONCLUSIONS: Longer travel time is associated significantly with greater mortality risk and decreased HR-QOL. Exploring opportunities to decrease travel time should be incorporated into the dialysis clinical routine.

Munoz, R. I., J. Montenegro, et al. (2008). "Effect of acetate-free biofiltration with a potassium-profiled dialysate on the control of cardiac arrhythmias in patients at risk: a pilot study." Hemodial Int 12(1): 108-13.

Cardiac arrhythmias are a frequent event in chronic hemodialysis patients. The aim of this study was to evaluate the efficacy and safety of acetate-free hemofiltration with potassium-profiled dialysate (AFB-K) dialysis compared with constant potassium acetate-free biofiltration (AFB). Twelve patients (mean age 79 years) affected by cardiac arrhythmias or at a high risk for arrhythmia (advanced age, hypertension, left ventricular hypertrophy, heart valve disease, coronary artery disease, diabetes, paroxysmal atrial fibrillation) participated in a single-center, sequential cohort study. All were treated with hemodialysis 3 times per week, using constant potassium AFB for the first 3 weeks, followed by an AFB-K dialysate for the subsequent 3 weeks. The hemofilter, duration of dialysis, and electrolyte concentration were the same in both treatments. Both AFB-K and constant potassium AFB dialytic techniques were safe and well tolerated. The results of biochemical tests were similar, except for serum potassium levels after 2 hr of dialysis, which were significantly higher in the AFB-K group (4.0 mmol/L) than in the constant potassium AFB group (3.6 mmol/L) ($p<0.001$). All cardiac variables improved during AFB-K dialysis. There was a significant reduction of postdialysis QT intervals corrected for heart rate in the AFB-K group (448.8 ms) compared with the constant potassium AFB group (456.8 ms) ($p=0.039$). The severity and mean number of ventricular extasystoles also decreased (163.5 vs. 444.5/24 hr). Potassium

profiling during hemodialysis treatment may be beneficial for patients with arrhythmias or at those risk of arrhythmias, particularly those with predialysis hyperkalemia.

Murcutt, G. (2007). "Guarding against hidden haemolysis during dialysis: an overview. Summary of the EDTNA/ERCA Journal Club discussion Spring 2007." J Ren Care 33(4): 191-5.

The paper discussed during spring 2007 was a case study report entitled "Haemolysis: A Hidden Danger" published in The Nephrology Nursing Journal. The authors, Elisabeth Harman and Paula Dutka, agreed to follow the discussion and respond to points raised. Sixteen contributors from ten different countries provided insights into the potential causes, symptoms and effects of both acute and hidden haemolysis during dialysis, as well as discussing some of the safety systems that can be used to try and minimise occurrences. The use of blood volume monitoring as a potential method of 'seeing' hidden haemolysis was explored as well as some reporting mechanisms and organisational safeguards that are used to manage the risks.

Narita, I., S. Iguchi, et al. (2008). "Uremic pruritus in chronic hemodialysis patients." J Nephrol 21(2): 161-5.

Skin itching (pruritus) affects 50%-90% of patients undergoing peritoneal dialysis or hemodialysis and the symptoms range from localized and mild to generalized and severe. Among the dermatological abnormalities associated with end-stage renal disease, pruritus is the most prevalent. Of all systemic disorders, uremia is the most important cause of pruritus. The mechanism underlying uremic pruritus is poorly understood: secondary hyperparathyroidism, divalent-ion abnormalities, histamine, allergic sensitization, proliferation of skin mast cells, iron-deficiency anemia, neuropathy and neurological changes, or a combination of these have been hypothesized. Severe pruritus not only affects the quality of life but is also associated with poor outcome in chronic hemodialysis patients. No specific, effective treatment is currently available for uremic pruritus. Further studies are necessary to evaluate the long-term efficacy and safety of a novel kappa-opioid agonist, nalfurafine. Early diagnosis and treatment of uremic pruritus focusing on general strategies that include the optimization of dialysis dose, erythropoiesis-stimulating agents, and management of secondary hyperparathyroidism is recommended.

Nugent, E. (2006). "Standards of care in practice: the nurse's role in effecting change." Nephrol Nurs J 33(5): 573-4.

Elderly patients on dialysis present a special challenge because they are often unsure of taking their health into their own hands and may be more resistant to self-management. When G.B. started on dialysis, he had little knowledge of what this entailed and self-management was not a concept that he could accept. Assertive communication with caregivers and protective self-management strategies were stressed as he transitioned to the unit. He did not complain to his providers when cannulation became more difficult, perhaps because of what he perceived as negative repercussions (Curtin, Sitter, Schatell, & Chewning, 2004). Reassurance, presence, and explanations were helpful in alleviating G.B.'s fears of speaking up. Communication was critical and required an ongoing effort by the staff. End of life issues common to the elderly patient include establishing an advance directive. G.B. chose a do not resuscitate status. He discussed his wishes with the social worker and though he did not want heroic efforts if he was at his home, he wanted reasonable measures done while at the dialysis center. Therefore, he decided that full resuscitative measures should be instituted. He was not a candidate for transplantation. G.B. presents with many issues familiar to dialysis nurses. On going and ever-changing planning is

needed for the patient undergoing any extracorporeal treatment. As the primary contact with the patient the nurse is also the primary communicator with the physician who rounds in the dialysis unit. In addition, problem identification and initiation of referrals makes the nurse the most important connection for the patient on dialysis. This case uses the recently revised standards of care for nephrology nursing and the KDOQI guidelines. The standards support the creativity and decision making needed for individual patients in planning of care (Amato, 2006; Burrows-Hudson & Prowant, 2005) and the KDOQI guidelines substantiate interventions used in caring for G.B. Interpretation of the guidelines for individual patients and families is an important step. Problems for the elderly as they undergo hemodialysis require ongoing assessment and evaluation in order to bridge care from dialysis to end of life. Each of the guidelines offers just that, a guideline for the stages and experiences of the patient on dialysis.

Nystrand, R. (2008). "Microbiology of water and fluids for hemodialysis." J Chin Med Assoc 71(5): 223-9.

In hemodialysis, huge amounts of water are used for diluting the concentrates to produce dialysis fluid. The water is produced on site by reverse osmosis units. The chemical and microbiological quality of the water is essential for dialysis patients. Reverse osmosis units produce water of acceptable chemical quality that can be kept throughout the water system. The microbiological water quality, on the other hand, does not depend on the reverse osmosis unit but on the maintenance of the whole water system. All over the world, dialysis units take water samples and send them to laboratories for cultivation and endotoxin tests. Depending on the method of microbiological analysis, the water may be judged to be very good even if in reality it is much worse and outside of standard recommendations. When standardizing the methods with adequate cultivation of water samples, the accuracy of the tests will be better, and as a result, dialysis units can use their resources for keeping the water systems in good shape, i.e. disinfect preventively and frequently and use less effort in collecting samples. This will benefit patients, who will receive a high-quality dialysis fluid, thus eliminating the effects of microbiological impacts such as increased levels of inflammation markers (e.g. C-reactive protein). In the situation of performing hemodiafiltration by producing the substitution fluid "on-line", it is even more important to have a sensitive method of microbiological verification to follow-up the hygienic quality.

Obialo, C. I., K. Bashir, et al. (2008). "Dialysis "no-shows" on saturdays: implications of the weekly hemodialysis schedules on nonadherence and outcomes." J Natl Med Assoc 100(4): 412-9.

BACKGROUND: The prevalence of skipped hemodialysis or no-show is higher among African Americans, younger Sages, smokers and illicit drug users. The effect of the weekly hemodialysis treatment schedules (Mondays, Wednesdays, Fridays (MWF); or Tuesdays, Thursdays, Saturdays (TTS)] on adherence is unknown. METHODS: Our hemodialysis patients were prospectively monitored for compliance over a 12-month duration. Regression analyses were employed for associations between variables and outcomes. RESULTS: A total of 114 African-American patients-mean age 55 +/- 14 and 53% male--were surveyed. Compared to the MWF, the TTS patients had higher rates of no show (2.4% vs. 1.7%, p = NS); shortened hemodialysis time (30% vs. 26%, p = NS); cocaine use (18% vs. 8%, p = 0.09); higher interdialytic weight gain 14.3 +/- 1.8 kg vs. 3.4 +/-1.3 kg, p = 0.005); prolonged length of hospital stay (9 +/- 12 days vs. 4 +/- 5 days, p = 0.02); and higher mortality (16% vs. 8%, p = NS). Compared to other days of the week, the Saturday no-show rate was significantly higher: 31% vs. 13%, 15%, 16%, 17%, 8%, Monday through Friday, respectively. Length of hospital stay correlated with no show (R2 = 0.4, p <

0.0001), while early termination was associated with smoking, cocaine use, female gender, TTS schedule, low serum albumin, hematocrit and adequacy of dialysis (Kt/V) (R2 = 0.6, p = 0.009). Conclusions: The TTS-scheduled hemodialysis patients are less adherent, and have higher morbidity than the MWF Spatients and a predilection for skipping on Saturdays.

Pendergrast, J. M., M. A. Hladunewich, et al. (2006). "Hemolysis due to inadvertent hemodialysis against distilled water: Perils of bedside dialysate preparation." Crit Care Med 34(10): 2666-73.

OBJECTIVE: To describe the physiologic consequences of dialysis against distilled water and to provide recommendations by which other institutions may avoid similar errors in dialysate preparation. DATA SOURCE: Four cases of dialysis against distilled water are described, occurring at three teaching hospitals within a 2-yr period. In addition, an in vitro experiment of banked whole blood exposure to distilled water dialysate was performed. DATA EXTRACTION: Because all four cases occurred within a critical care setting, intensive monitoring of clinical, biochemical, and hematologic abnormalities was possible. DATA SYNTHESIS: Serum sodium decreased by an average of 22 mmol/L, followed by a decrease in hemoglobin averaging 32 g/L. Additional investigations and the in vitro experiment provided evidence that hemolysis occurred primarily via clearance of damaged erythrocytes within the patient's reticuloendothelial system. Physiologic derangements secondary to dialysis against distilled water likely contributed to a stroke suffered by one patient and the death of at least one other patient. CONCLUSIONS: Accidental dialysis against distilled water is a potentially serious but preventable complication of bedside dialysate preparation.

Pervez, A. and K. Abreo (2007). "Techniques and tips for quick and safe temporary catheter placement." Semin Dial 20(6): 621-5.

Nephrologists have to place temporary dialysis catheters for hemodialysis in emergency situations. Since there is a dearth of literature on this subject, the authors have written guidelines for the safe and successful placement of these catheters. These instructions should be of help to nephrology trainees who want to master the art of central venous line placement. Based on their experience, the authors have provided a number of tips and techniques for temporary catheter placement in the femoral, internal jugular, and subclavian veins, with and without ultrasound guidance. Patient positioning, preparation of the catheter insertion tray, handling of ultrasound probe, cannulation of the central veins, and guide wire and dilator insertion are described in detail. These guidelines should assist the novice in placing temporary catheters with ease and with minimal complications.

Petra, E., P. Varughese, et al. (2006). "Use of quality index tracking to drive improvement in clinical outcomes." Nephrol News Issues 20(8): 67-8, 70-1, 83.

BACKGROUND: DAVITA QUALITY INDEX (DQI) is a scoring index that allows DaVita facilities to evaluate various aspects of patient clinical outcomes. This index was developed by DaVita Inc., the managing company of the Richmond Kidney Center. RKC is a 23-station hemodialysis clinic that provides end-stage renal disease care to 140 patients in Staten Island, New York. In December 2002, RKC ranked 358 out of 502 clinics based on the DQI. In January 2003, a new medical director was appointed to oversee the care of these patients. Recognizing the relatively poor standing of our facility's DQI score, we developed a core team that monitored clinical performance and sought to improve results. The team consisted of the medical director, administrator, nurse manager, social worker, and dietitian. By January 2005, RKC had significantly

improved its DQI and ranked fourth out of 658 clinics. This article will summarize how this unit successfully improved their clinical outcomes utilizing the DQI index developed by DaVita.

Pisoni, R. L., B. Wikstrom, et al. (2006). "Pruritus in haemodialysis patients: International results from the Dialysis Outcomes and Practice Patterns Study (DOPPS)." Nephrol Dial Transplant 21(12): 3495-505.

BACKGROUND: Pruritus affects many haemodialysis (HD) patients. In this study, pruritus and its relationship to morbidity, mortality, quality of life (QoL), sleep quality and patient laboratory measures were analysed in >300 dialysis units in 12 countries. METHODS: Pruritus data were collected from 18 801 HD patients in the Dialysis Outcomes and Practice Patterns Study (DOPPS) (1996-2004). Analyses were adjusted for age, gender, black race, Kt/V, haemoglobin, serum albumin, albumin-corrected serum calcium, serum phosphorus, 13 comorbidities, depression, years on dialysis, country and facility clustering effects. RESULTS: Moderate to extreme pruritus was experienced by 42% of prevalent HD patients in DOPPS during 2002/2003. Many patient characteristics were significantly associated with pruritus, but this did not explain the large differences in pruritus between countries (ranging from 36% in France to 50% in the UK) and between facilities (5-75%). Pruritus was slightly less common in patients starting HD than in patients on dialysis >3 months. Pruritus in new end-stage renal disease (ESRD) patients likely results from pre-existing conditions and not haemodialysis per se, indicating the need to understand development of pruritus before ESRD. Patients with moderate to extreme pruritus were more likely to feel drained [adjusted odds ratio (AOR) = 2.3-5.2, P < 0.0001] and to have poor sleep quality (AOR = 1.9-4.1, P < or = 0.0002), physician-diagnosed depression (AOR = 1.3-1.7, P < or = 0.004), and QoL mental and physical composite scores 3.1-8.6 points lower (P < 0.0001) than patients with no/mild pruritus. Pruritus in HD patients was associated with a 17% higher mortality risk (P < 0.0001), which was no longer significant after adjusting for sleep quality measures. CONCLUSIONS: The pruritus/mortality relationship may be substantially attributed to poor sleep quality. The many poor outcomes associated with pruritus underscore the need for better therapeutic agents to provide relief for the 40-50% of HD patients affected by pruritus.

Plantinga, L. C., N. E. Fink, et al. (2007). "Early, intermediate, and long-term risk factors for mortality in incident dialysis patients: the Choices for Healthy Outcomes in Caring for ESRD (CHOICE) Study." Am J Kidney Dis 49(6): 831-40.

BACKGROUND: Knowing whether risk factors for mortality differ in dialysis patients who survive longer and the strengths of these risk factors for mortality change over time would assist physicians in making better prognostic judgments. STUDY DESIGN: Prospective cohort study. SETTING & PARTICIPANTS: 1,041 incident dialysis patients treated in 81 clinics (mean follow-up, 3.1 years). PREDICTOR: A parsimonious set of risk factors (older age, white race, unemployed status, comorbidity, ever smoking, decreased systolic blood pressure, and decreased serum albumin level) chosen from several available demographic, clinical, and laboratory variables. OUTCOMES & MEASUREMENTS: Long-term (4+ years) survival and mortality over yearly intervals of follow-up, examined in logistic regression and Cox proportional hazards analyses. RESULTS: All baseline risk factors were associated with a decreased chance of surviving 4+ years, even after adjustment for confounders. Increased age was a strong and independent risk factor for mortality over all yearly intervals; comorbidity, smoking, and decreased blood pressure were early risk factors; low albumin level and unemployed status were intermediate risk factors; and white race was a late risk factor. When risk factors were updated with time, low albumin level and severe

comorbidity became significant risk factors over most intervals. LIMITATIONS: Lack of some follow-up data and inability to rule out residual confounding or make causal inference based on results. CONCLUSION: Long-term survivors on dialysis therapy may have different risk factors for mortality than patients in earlier phases of end-stage renal disease (eg, race versus blood pressure); other risk factors may be constant over time (eg, age, comorbidity, and albumin level). Such information may help guide physicians in making prognostic judgments for individual patients with particular dialysis vintages.

Prescott, M. (2006). "Managing mental illness in the dialysis treatment environment: a team approach." Nephrol News Issues 20(13): 32-3, 36-9, 41.

Outpatient chronic hemodialysis facilities often serve large populations of patients in an open and sometimes fast-paced environment. Any sizeable group of people will contain a sample of mental illnesses -and the end-stage renal disease diagnosis can be accompanied by co-occurring or comorbid mental illness. Thus, it is important for professional teams to be able to effectively manage related issues arising in the dialysis clinic. Guided by Medicare mandates, dialysis clinics all employ a masters level social worker to respond to the myriad psychosocial needs of this population; MSWs are trained to recognize the signs and symptoms of mental illnesses, and can help guide the team response.

Punal, J., L. V. Lema, et al. (2008). "Clinical effectiveness and quality of life of conventional haemodialysis versus short daily haemodialysis: a systematic review." Nephrol Dial Transplant 23(8): 2634-46.

BACKGROUND: End-stage renal disease is a troublesome health problem worldwide. The most usual renal replacement therapy is conventional haemodialysis (CHD), performed three times a week, 3.5-4 h per session. It has been proposed that this schedule is unphysiologic and that daily haemodialysis would be a more appropriate schedule. One of the variants of daily haemodialysis is the so-called short daily haemodialysis (SDHD), performed five to seven times per week, 1.5-3 h per session. The objective of this paper is to compare, through a systematic review, the clinical effectiveness and safety of SDHD versus CHD. METHODS: The following databases were searched: MEDLINE, EMBASE, NHS Centre for Reviews and Dissemination (HTA, DARE and NHS EED), Cochrane, ISI Web of Knowledge, IME and IBECS. Two independent reviewers decided which papers were to be included after applying inclusion and exclusion criteria. Any discrepancy was resolved by consensus. The quality of the included papers was measured using a quality scale developed for the purpose of this report. RESULTS: Seventeen original articles were included. There were no randomized controlled trials. SDHD seems to be more effective than conventional dialysis. Patients on daily haemodialysis seem to present less vascular access problems, better control of hypertension and in turn a reduction in the antihypertensive treatment, better quality of life, lower incidence of ventricular hypertrophy, lower consumption of rHuEPO due to the better control of anaemia and a reduction in the use of phosphate binders as a consequence of the better control of plasmatic phosphorous. CONCLUSIONS: SDHD might result in a better clinical effectiveness, mainly through a better control of the arterial tension and, therefore, a lower consumption of antihypertensive drugs, and a better quality of life than CHD.

Reed, J., C. Charytan, et al. (2007). "The safety of intravenous iron sucrose use in the elderly patient." Consult Pharm 22(3): 230-8.

BACKGROUND: This study was undertaken to assess the safety and tolerability of the use of intravenous (IV) iron sucrose in the therapy of iron-deficiency anemia in elderly, hemodialysis dependent (HDD), chronic kidney disease (CKD) patients. METHODS: This was a multicenter, open-label study in a large consecutive sample of 665 HDD-CKD patients (in 11 locations). Patients received IV iron sucrose therapy in treatment and maintenance dosing cycles over 10-week periods. There were 10 doses of 100 mg of iron sucrose in each drug cycle, and participants could receive multiple cycles of either or both regimens. Variables evaluated in the intent-to-treat population included adverse events (AEs), hemoglobin, and iron indices. RESULTS: Of the 665 patients, 391 patients were under the age of 65 (younger adults) and 274 were 65 years of age or older (elder adults). Iron needs and erythropoietin dosing were similar in both the elder and younger adult patients. The incidence, severity, and nature of AEs and overall mortality were similar in both age groups. There were no drug-related deaths or drug-related serious AEs in either group. There were no hypersensitivity reactions or allergic reactions in either patient population, even among those with a prior history of intolerance to other parenteral-iron products. Comparison of the two age groups also revealed no differences in the efficacy of iron treatment as reflected by hemoglobin, transferring saturation, and ferritin response. CONCLUSIONS: There is no apparent difference in the safety and efficacy of iron sucrose between elder and younger adults in the treatment of iron-deficiency anemia in HDD patients with CKD.

Roberts, R., C. Jeffrey, et al. (2007). "Prospective investigation of the incidence of falls, dizziness and syncope in haemodialysis patients." Int Urol Nephrol 39(1): 275-9.

BACKGROUND: Prevention of falls in the elderly is a major health care target. There are theoretical reasons why older dialysis patients may be at high risk of falls: co-morbidity, medication, and post-dialysis hypotension, which have not been well tested. Dialysis patients are also at higher risk of fracture if they do fall. METHODS: We prospectively interviewed all our centre haemodialysis patients over a 6 month period to see if they reported falls, syncope, pre-syncope or dizziness. Routine blood pressure (BP) and other clinical data were recorded. RESULTS: A total of 78 patients completed the study. There was a high incidence of all four symptoms but only falls was age-related. About 38% of patients aged >65 reported 1 or more fall compared to 4% of younger patients (p < 0.001). There were no significant differences in pre-dialysis, post-dialysis or standing BP between young and older patients or between fallers and non-fallers although the older patients did have a greater magnitude in change between pre-dialysis BP and post-dialysis standing BP. CONCLUSIONS: Older haemodialysis patients have a high incidence of falls. Falls can be prevented by addressing modifiable risk factors. Whether existing guidelines are applicable to this specialised population is uncertain. There is a high incidence of syncope in dialysis patients of all ages and the cause of this needs further exploration.

Rodriguez, R. A., S. Sen, et al. (2007). "Geography matters: relationships among urban residential segregation, dialysis facilities, and patient outcomes." Ann Intern Med 146(7): 493-501.

BACKGROUND: End-stage renal disease disproportionately affects black Americans. However, the impact of residential segregation by race-a prominent feature of many U.S. cities--on outcomes of patients receiving dialysis and on facility performance has not been evaluated. OBJECTIVE: To examine the relationship among racial composition of ZIP codes in metropolitan areas, outcomes of patients receiving dialysis, and characteristics of dialysis facilities. DESIGN: Retrospective cohort study of patients receiving dialysis and cross-sectional study of dialysis

facilities. SETTING: U.S. metropolitan ZIP codes with differing percentages of black residents. PATIENTS: Black and non-Hispanic white patients who initiated long-term dialysis between 1 January 1995 and 31 December 2002 (n = 399,424) and dialysis facilities in operation in December 2004 (n = 3244). MEASUREMENTS: Mortality and time to transplantation among patients receiving dialysis, and performance of dialysis facilities on the basis of quality indicators (anemia management, dialysis adequacy, and facility-level mortality rates). RESULTS: Most black patients (50.3%) but few white patients (5%) lived in the 3% (n = 769) of ZIP codes in which most residents were black. In analyses adjusted for patient and ZIP code characteristics, mortality rates were higher among white patients but not among black patients living in areas with a higher percentage of black residents (adjusted hazard ratio for ZIP codes with > or =75% black residents vs. <10% black residents, 1.14 [95% CI, 1.07 to 1.21] for white patients and 1.02 [CI, 0.99 to 1.06] for black patients). Time to transplantation was longer among both black and white patients (adjusted hazard ratio for ZIP codes with > or =75% black residents vs. <10% black residents, 0.84 [CI, 0.78 to 0.92] and 0.63 [CI, 0.57 to 0.71] for black patients and white patients, respectively). Dialysis facilities located in areas with a higher percentage of black residents were more likely to have higher-than-expected mortality rates and were less likely to meet performance targets. LIMITATIONS: Patient-level analyses were restricted to black and non-Hispanic white patients. Patient-level and facility-level analyses focused only on the percentage of black residents in each ZIP code. CONCLUSIONS: The racial composition of urban residential areas is associated with time to transplantation and dialysis facility performance on standard quality measures. Closer scrutiny of care provided to patients receiving dialysis who live in predominantly black residential areas and to dialysis facilities operating in these areas may be warranted.

Ross, E. A., C. Briz, et al. (2006). "Method for detecting the disconnection of an extracorporeal device using a patient's endogenous electrical voltages." Kidney Int 69(12): 2274-7.

Tubing (especially venous) disconnections using pumped devices cause significant hemorrhage, and current monitoring techniques are imperfect because they rely on intraluminal pressure changes. We devised a passive detection method based on a patient's electrical voltages being transmitted via blood tubing to our alarm circuit. As the arterial and venous access sites are in close proximity, the signals are nearly identical during connection, and markedly different with disconnection. We built a prototype and tested it in vitro with saline and during hemodialysis treatments (n=7). The connection status is determined by examining the difference between endogenous voltages in the blood tubing from and to the patient, and when it exceeds a threshold an alarm condition is triggered. We tested for possible confounding by an electrical shunt through the dialyzer and determined that pathway had an impedance approximately three times (>350 kOmega) that of the tubing to the patient. As the roller blood-pump periodically occluded the tubing, the resultant intermittent very high impedance prevented that potential shunting problem and improved the sensitivity of our device. Disconnections were detectable at various bloodline sites (needles, sampling ports, drip chambers). Thus, the circuit's sensors can be placed remotely at the dialysis machine, with electrical continuity to blood made by inexpensive conductive elements at the tubing wall or drip chambers. Appropriate threshold and noise-eliminating circuitry, as well as alarm states that alert the staff and stop the blood pump, make our prototype a promising low-cost safety enhancement.

Santoro, A., E. Ferramosca, et al. (2008). "Biofeedback-driven dialysis: where are we?" Contrib Nephrol 161: 199-209.

The progressive increase in the mean age and the growing conditions of co-morbidity, especially of cardiovascular pathologies and diabetes, have significantly worsened the patients' clinical status and tolerance to the hemodialysis (HD) treatment. On the other hand, the demand for short treatment times enhances the risk for hemodynamic instability as well as for inadequate depuration. The traditional management of the dialysis session, setting of predefined treatment parameters, with active therapeutic interventions only in the event of complications, is definitely unsuitable for short-lasting treatments, often complicated by hemodynamic instability, especially in critical patients. The first step to improve the management of the dialysis session is the utilization of continuous and uninvasive monitoring systems for hemodynamic or biochemical parameters involved in the dialysis quality. Special sensors for the continuous measurement of blood volume, blood temperature, blood pressure, heart rate, electrolytes, have been realized throughout the last 10 years. As a second step, some of these devices have been implemented in the dialysis instrumentation, mainly with a view to preventing cardiocirculatory instability but also to control the dialysis efficiency (biofeedback control systems). The basic components of a biofeedback system are: the plant, the sensors, the actuators and the controller. The plant is the biological process that we need to control, while the sensors are the devices used for measuring the output variables. The actuators are the working arms of the controller. The controller is the mathematical model that continuously sets the measured output variable against the reference input and modifies the actuators in order to reduce any discrepancies. Yet, in practice there are a number of conceptual, physical and technological difficulties to be overcome. In particular, the behavior of what is to be controlled may be non-linear and time-varying, with interactions between the actuators and the controlled variable. In these cases, more sophisticated control systems are needed, which must be capable of identifying the behavior of the process, and continuously update information data while the control is on. These complex systems are called adaptive controllers. In dialysis, over the last few years, it has been relatively easy to realize some biofeedback systems since a series of sensors have been developed for online monitoring. Three biofeedback devices are routinely used with the aim of improving the cardiovascular instability, one of the main problems limiting the tolerance to treatment by the patient and the quality of HD in itself - the first is the biofeedback control of blood volume, the second is the biofeedback control of thermal balance, and the third is the biofeedback control of blood pressure.

Saxena, A. K., B. R. Panhotra, et al. (2006). "Tunneled catheters' outcome optimization among diabetics on dialysis through antibiotic-lock placement." Kidney Int 70(9): 1629-35.

Efficacy and safety of antibiotic 'locks', in prevention of thrombotic and infectious complication-related morbidity and mortality, among diabetics dialyzed through tunneled-cuffed catheters (TCCs) has not been effectively investigated. This trial was designed to investigate the outcome of TCCs (n = 109), inserted among 96 diabetic end-stage renal disease patients (March 2002-February 2003), by comparing the catheter thrombosis, catheter-related bloodstream infections (CRBSI), catheter survival, and mortality rates, between the cohorts of 49 patients who had TCCs (n = 51) 'locked' with cefotaxime/heparin (group I) and 47 patients with TCCs (n = 58) filled with standard heparin (group II). Thrombosis was defined as the inability to use catheter at a blood flow of 200 ml/min despite intraluminal thrombolysis. Primary end points were catheter thrombosis and CRBSI; elective catheter removal and CRBSI-related death led to sensor of TCCs follow-up. Patients with intraluminal cefotaxime/heparin lock, on cumulative survival analysis,

showed a superior thrombosis-free (86.3 vs 63.8%, P = 0.023, log rank), infection-free (72.9 vs 27.1%, P = 0.004, log rank), and thrombosis- and infection-free TCC survival (78.4 vs 37.9%, P = 0.001, log rank) at 365 days, besides having significantly lower incidence of CRBSI (1.56 vs 3.68 episodes/1000 catheter days, P < 0.0001) and CRBSI-related mortality (9.8 vs 23.4%, P = 0.015), compared with the heparin-alone group. Deployment of cefotaxime-heparin 'lock' enhances catheter survival; reduces thrombotic and infectious complications and ensuing mortality, among diabetics on dialysis. However, further studies are needed to define the long-term implications of antibiotic locks in terms of the risk of emergence of antimicrobial resistance.

Schieren, G., F. Tokmak, et al. (2008). "C-reactive protein levels and clinical symptoms following gadolinium administration in hemodialysis patients." Am J Kidney Dis 51(6): 976-86.

BACKGROUND: Until recently, gadolinium (Gd)-enhanced magnetic resonance imaging (MRI) has increasingly replaced iodinated contrast agent examinations in dialysis patients, although only limited data existed about the clinical safety of Gd contrast agents in these patients. Specific clinical adverse events (AEs), including nephrogenic systemic fibrosis, were linked to Gd exposure in dialysis patients. An inflammatory reaction or transmetallation may be involved. STUDY DESIGN: Secondary analysis of a 5-day observational study in a parent cardiovascular study with repetitive cardiac MRI (32 patients) and patients undergoing Gd-enhanced MRI for clinical indications (6 patients). Clinical information and samples were obtained according to parent protocol. SETTING & PARTICIPANTS: Dialysis patients at a university-based dialysis unit. PREDICTOR: Gd-chelate complex. 37 of 38 patients underwent 64 MRI studies with Gd-diethylenetriamine penta-acetic acid (Gd-DTPA). 25 of these patients underwent additional MRI studies with gadobutrol (n = 10), 0.9% saline (n = 7), or both (n = 8), and 1 patient received gadobutrol only. OUTCOMES: Clinical adverse events; C-reactive protein (CRP) levels on days 1, 3, and 5 after MRI; Gd levels in blood and urine after MRI. RESULTS: CRP levels increased 10-fold on day 3 after MRI in 87% of MRI studies with Gd-DTPA (+59.3 +/- 57.9 mg/L [P < 0.001] versus -0.9 +/- 3.7 mg/L with gadobutrol versus -0.9 +/- 8.5 mg/L with 0.9% saline). 77 mild to moderate and 3 serious AEs were observed in 24 patients. CRP levels and adverse events did not correlate with Gd blood concentrations. CRP level increase or AEs were not observed after MRI with gadobutrol or 0.9% saline. LIMITATIONS: Observational study without randomization, risk of bias because of multiple MRI studies in a limited patient cohort. CONCLUSION: Gd-DTPA, but not gadobutrol, induces an acute-phase reaction and clinical AEs in dialysis patients. Additional investigations have to analyze the underlying pathomechanism.

Schild, A. F., E. A. Perez, et al. (2007). "Use of the Vectra polyetherurethaneurea graft for dialysis access in HIV-positive patients with end-stage renal disease." Vasc Endovascular Surg 41(6): 506-8.

The primary objective of this study was to establish the safety, efficacy, infection rate, and patency of the Vectra graft (polyetherurethaneurea) for dialysis access in patients diagnosed with human immunodeficiency virus (HIV) and end-stage renal disease. The Vectra graft has a unique self-sealing property; therefore we hypothesize that these patients will have fewer infections. A Vectra graft was implanted in 30 consecutive HIV-positive patients without sufficient veins for an autologous fistula. These surgeries were carried out over a 2.5-year period. Primary graft patency was 42% at 12 months and 3 (10%) of the grafts developed infection. This rate of graft infection was less (10% vs 45%) than both our prior experience and published reports using polytetrafluorothene bridge grafts. The unique self-sealing property of the Vectra graft minimizes

the development of perigraft hematoma with repetitive needle cannulation and in the immunosuppressed HIV-positive patient, may account for the observed decrease in dialysis access infection.

Schneider, M., K. Thomas, et al. (2007). "Efficacy and safety of intermittent hemodialysis using citrate as anticoagulant: a prospective study." Clin Nephrol 68(5): 302-7.

BACKGROUND: The use of trisodium-citrate for regional anticoagulation of the extracorporal circuit during renal replacement therapy (RRT) has received increased interest, particularly in critically ill patients with increased risk of bleeding. Continuous renal replacement therapies are the most extensively investigated and used procedures in this regard. However, when patients recover from critical illness, RRT is often switched to intermittent procedures. In this prospective study, we investigated the efficacy and safety of citrate anticoagulation during intermittent hemodialysis (IHD) performed with a standard roller blood pump device. METHODS: We treated 11 critically ill patients with acute renal failure. These patients received a total of 31 intermittent IHD treatments. The targeted IHD treatment time was 6 h (4.5 l/h treatment dose). For anticoagulation, a 4% trisodium-citrate solution was continuously infused into the arterial line of the extracorporeal circuit. A calcium-free, lactate-based dialysis solution was used in all treatment procedures. Calcium was continuously substituted via a separate central line. Electrolyte and acid-base changes as well as the cardiovascular hemodynamics were analyzed. RESULTS: All patients achieved the targeted filter life time. Filter clotting did not occur. Electrolytes and acid base values were well-maintained throughout the study period. Particularly metabolic derangements were not observed. All treatments were hemodynamically well-tolerated. CONCLUSIONS: Intermittent hemodialysis with citrate anticoagulation can be safely applied in critically ill patients at high risk of bleeding.

Selby, N. M. and C. W. McIntyre (2006). "A systematic review of the clinical effects of reducing dialysate fluid temperature." Nephrol Dial Transplant 21(7): 1883-98.

BACKGROUND: Intradialytic hypotension (IDH) is a frequent complication of haemodialysis. Reducing the temperature of the dialysis fluid is a simple therapeutic strategy but is relatively underused. This may be due to concerns regarding its effects on symptoms and dialysis adequacy. We performed a systematic review of the literature to examine the effects of cool dialysis on intradialytic blood pressure, and to assess its safety in terms of thermal symptoms and small solute clearance. METHODS: We searched the Cochrane Central Register of Controlled Trials, Medline, Embase, Cumulative Index to Nursing and Allied Health Literature, databases of ongoing trials, the contents of four major renal journals as well as hand-searching reference lists. We included all prospective randomized studies that compared any technique of reducing dialysate temperature with standard bicarbonate dialysis. These techniques included an empirical, fixed reduction of dialysate temperature or use of a biofeedback temperature-control device (BTM) to deliver isothermic dialysis or programmed patient cooling. RESULTS: A total of 22 studies comprising 408 patients were included (16 studies examined a fixed empirical temperature reduction and six examined BTM). All studies were of crossover design and relatively short duration. IDH occurred 7.1 (95% CI, 5.3-8.9) times less frequently with cool dialysis (both fixed reduction and BTM). Post-dialysis mean arterial pressure was higher with cool-temperature dialysis by 11.3 mmHg (95% CI, 7.7-15.0). No studies reported that cool dialysis led to a reduction in dialysis adequacy as assessed by urea clearance. The frequency and severity of thermal-related symptoms were generally reported inadequately. CONCLUSIONS: Reducing the temperature of

the dialysate is an effective intervention to reduce the frequency of IDH and does not adversely affect dialysis adequacy. This applies to the fixed reduction of dialysate temperature and BTM. It remains unclear as to what extent cool-temperature dialysis causes intolerable cold symptoms during dialysis. There are no trials comparing fixed empirical temperature reduction with BTM, and no trials examining the long-term effects of cool dialysis on patient outcomes.

Shao, J., S. Wolff, et al. (2007). "In vitro comparison of peracetic acid and bleach cleaning of polysulfone hemodialysis membranes." Artif Organs 31(6): 452-60.

Dialyzer reuse has been employed throughout the history of hemodialysis, but the practice remains controversial. Many studies have found changes in the beta(2)-microglobulin clearance for reused dialyzers, but it is difficult to draw quantitative conclusions from the clinical data. The objective of this study was to quantitatively compare the effects of bleach and peracetic acid cleaning on the clearance and surface charge characteristics of Fresenius F80B polysulfone dialyzers (Fresenius Medical Care, Lexington, MA, USA). Clearance experiments were performed using urea, vitamin B(12), and polydisperse dextrans, with data obtained before and after exposure to human plasma in an in vitro dialysis circuit. Dialyzers cleaned with peracetic acid had significantly lower clearance of the larger dextrans due to the presence of residual protein on or within the membrane. Bleach was able to remove this protein deposit, restoring the clearance characteristics, but there was a significant increase in the net negative charge of the membrane due to chemical reaction with the bleach. In addition, longer time exposure to bleach altered the membrane transport characteristics, increasing the solute clearance. These results provide important insights into the effects of bleach and peracetic acid on the properties of the F80B dialyzers.

Shigematsu, T. (2008). "Lanthanum carbonate effectively controls serum phosphate without affecting serum calcium levels in patients undergoing hemodialysis." Ther Apher Dial 12(1): 55-61.

Treating hyperphosphatemia without increasing the calcium load in chronic kidney disease patients on dialysis is important, as conventional treatment frequently results in ectopic calcification. Sevelamer, a monotherapy for hyperphosphatemia is frequently associated with gastrointestinal disorders, often resulting in discontinuation of treatment. Lanthanum carbonate is a novel non-calcium-based phosphate binder for the treatment of chronic kidney disease. Here, its clinical efficacy and safety were assessed in Japanese dialysis patients. A placebo-controlled, randomized, double-blind, parallel group, multicenter study was performed in Japanese dialysis patients. Patients were treated with various dosages of lanthanum carbonate or a placebo daily for six weeks. The primary efficacy endpoint was the change in serum phosphate level from the baseline. Secondary endpoints included achievement rates to target serum phosphate levels and changes in serum calcium levels. Safety was evaluated by the incidence of drug-related and treatment-emergent adverse events. A significant reduction in serum phosphate level was demonstrated for all dosages from Week 1. This dose-dependent effect was also observed in the changes in serum calcium x phosphate product, yet there was no notable difference in serum calcium or serum intact parathyroid hormone levels. The incidence of drug-related adverse events was dose-dependent, with the most common being gastrointestinal symptoms. Lanthanum carbonate effectively controls serum phosphate levels and is generally tolerable to Japanese chronic kidney disease patients on dialysis, as reported for the Caucasian population. The optimal dosage in Japanese patients needs to be confirmed using a flexible-dose titration schedule.

Soman, S., G. Zasuwa, et al. (2008). "Automation, decision support, and expert systems in nephrology." Adv Chronic Kidney Dis 15(1): 42-55.

Increasing data suggest that errors in medicine occur frequently and result in substantial harm to the patient. The Institute of Medicine report described the magnitude of the problem, and public interest in this issue, which was already large, has grown. The traditional approach in medicine has been to identify the persons making the errors and recommend corrective strategies. However, it has become increasingly clear that it is more productive to focus on the systems and processes through which care is provided. If these systems are set up in ways that would both make errors less likely and identify those that do occur and, at the same time, improve efficiency, then safety and productivity would be substantially improved. Clinical decision support systems (CDSSs) are active knowledge systems that use 2 or more items of patient data to generate case specific recommendations. CDSSs are typically designed to integrate a medical knowledge base, patient data, and an inference engine to generate case specific advice. This article describes how automation, templating, and CDSS improve efficiency, patient care, and safety by reducing the frequency and consequences of medical errors in nephrology. We discuss practical applications of these in 3 settings: a computerized anemia-management program (CAMP, Henry Ford Health System, Detroit, MI), vascular access surveillance systems, and monthly capitation notes in the hemodialysis unit.

Sonawane, S., N. Kasbekar, et al. (2006). "The safety of heparins in end-stage renal disease." Semin Dial 19(4): 305-10.

In patients on chronic dialysis, unfractionated heparin (UFH) is the most commonly used agent for anticoagulation of the hemodialysis extracorporeal circuit, for hemodialysis catheter "locking" between dialysis treatments, and for nondialysis indications such as venous thromboembolic disease, peripheral vascular disease, and acute coronary artery disease. Potentially serious complications of UFH, such as hemorrhage, osteoporosis, and thrombocytopenia, have led to consideration of other options for anticoagulation, including low molecular weight heparin (LMWH) and direct thrombin inhibitors (DTIs). LMWH can be used for anticoagulation of the hemodialysis circuit, but whether this has significant benefit compared to UFH remains to be proven. Because of the somewhat unpredictable risk of severe bleeding complications when LMWH is used for other indications in dialysis patients, UFH rather than LMWH is preferred for treatment of thromboembolic disease in these patients. DTIs have been used for anticoagulation in dialysis patients with heparin-induced thrombocytopenia (HIT), with argatroban being the preferred agent if heparin-free hemodialysis cannot be performed. UFH still remains the preferred anticoagulant in the vast majority of dialysis patients requiring systemic anticoagulation and for anticoagulation of the extracorporeal hemodialysis circuit.

Sorensen, V. R., E. R. Mathiesen, et al. (2007). "Diabetic patients treated with dialysis: complications and quality of life." Diabetologia 50(11): 2254-62.

AIMS/HYPOTHESIS: The aim of this study was to describe the prevalence of complications, health-related quality of life (HRQOL) and the influence of beliefs about control over health in diabetic dialysis patients. METHODS: Of 53 eligible diabetic patients on chronic dialysis during January 2004 in our clinic, 38 (76%) completed a kidney-specific (Kidney Disease Quality of Life) and a generic (SF-36) questionnaire and were characterised in terms of cardiovascular diseases and diabetic complications. Matched groups of non-diabetic dialysis patients (n = 40) and diabetic patients with a long duration of diabetes and normal kidney function

(n = 38) served as controls. Generic HRQOL was compared with matched data from a survey on the Danish general population (n = 2248). RESULTS: Micro- and macrovascular complications were significantly more frequent in diabetic dialysis patients than in diabetic patients without renal disease. Self-rated physical health was significantly worse (p < 0.01) in diabetic dialysis patients (35 +/- 9 [mean +/- SD]) compared with non-diabetic dialysis patients (41 +/- 10), diabetic patients with normal kidney function (45 +/- 12) and the matched general population (47 +/- 19). The diabetic dialysis patients had similar levels of kidney-specific quality of life and mental health compared with the control groups. Reduced physical health was predicted by the presence of end-stage renal disease, diabetes and short time spent in education. Among the diabetic patients, those who believed more on their own ability to control their diabetes and less on chance reported better mental health and were less likely to be on dialysis. CONCLUSIONS/INTERPRETATIONS: Diabetic dialysis patients are characterised by a high prevalence of diabetic complications, reduced self-rated physical health but relatively good mental health.

Sousa, C. N., M. Gama, et al. (2008). "Haemodialysis for children under the age of two years." J Ren Care 34(1): 9-13.

Less than 10% of children under 2 years old with end-stage renal failure in Europe and in the United States of America are treated with haemodialysis. For small children, peritoneal dialysis is often the preferred treatment. Haemodialysis is chosen for a very small number of children, and is only used in some selected centres because of its highly complex technique, the difficulties related to vascular access, and the need to have a skilled and experienced nursing and medical team. With the technological development of recent years, the quality of dialysis treatment offered to paediatric patients has improved considerably and haemodialysis is presently considered to be a safe and efficient treatment for acute or chronic paediatric renal impairment. However, because a successful renal transplant continues to be linked to a better quality of life for children with terminal chronic renal impairment, dialysis ought to be regarded as a temporary treatment method, while waiting for a renal transplant.

Souweine, B., J. Liotier, et al. (2006). "Catheter colonization in acute renal failure patients: comparison of central venous and dialysis catheters." Am J Kidney Dis 47(5): 879-87.

BACKGROUND: Little is known about vascular access infections in patients with acute renal failure. METHODS: We prospectively compared infection rates of dialysis catheters (DCs) and central venous catheters (CVCs) in patients in the intensive care unit treated with renal replacement therapy for acute renal failure. The same insertion and maintenance procedures were used for CVCs and DCs. To circumvent the allocation bias caused by severity of patient condition, only patients with both types of catheters were included. RESULTS: A total of 150 CVCs and 130 DCs were analyzed in 99 patients with a mean Simplified Acute Physiology Score II of 67 +/- 21. The major cause of acute renal failure was sepsis (62%). Hospital mortality was 62%. Mean catheter duration was shorter for DCs (6.7 +/- 4.4 days) than CVCs (7.8 +/- 4.9 days; P = 0.03). There was no difference between CVCs and DCs in cumulative incidence of catheter colonization (quantitative catheter cultures > or = 10(3) colony-forming units/mL; 4.7% versus 6.2%; P = 0.58) or incidence density of catheter colonization per 1,000 catheter days (5.9 versus 9.1; P = 0.44, respectively). There also was no difference between CVCs and DCs in cumulative incidence and incidence density regardless of whether catheters were placed at the internal jugular (P = 0.34 and P = 0.23) or femoral site (P = 0.57 and P = 0.80), respectively. Three cases of CVC-related bacteremia (the same microorganism responsible for both catheter colonization and blood culture

result) were recorded, but none with DC use. CONCLUSION: When severity of patient condition is controlled for, epidemiological characteristics of colonization in CVCs and DCs are similar if similar infection control measures are used for insertion and maintenance.

Stark, S. (2006). "Setting quality measures for dialysis in SNFs." Nephrol News Issues 20(11): 26, 28-9.

Suri, R. S., A. X. Garg, et al. (2007). "Frequent Hemodialysis Network (FHN) randomized trials: study design." Kidney Int 71(4): 349-59.

Observational studies suggest improvements with frequent hemodialysis (HD), but its true efficacy and safety remain uncertain. The Frequent Hemodialysis Network Trials Group is conducting two multicenter randomized trials of 250 subjects each, comparing conventional three times weekly HD with (1) in-center daily HD and (2) home nocturnal HD. Daily HD will be delivered for 1.5-2.75 h, 6 days/week, with target eK(t)/V(n) > or = 0.9/session, whereas nocturnal HD will be delivered for > or = 6 h, 6 nights/week, with target stdK(t)/V of > or = 4.0/week. Subjects will be followed for 1 year. The composite of mortality with the 12-month change in (i) left ventricular mass index (LVMI) by magnetic resonance imaging, and (ii) SF-36 RAND Physical Health Composite (PHC) are specified as co-primary outcomes. The seven main secondary outcomes are between group comparisons of: change in LVMI, change in PHC, change in Beck Depression Inventory score, change in Trail Making Test B score, change in pre-HD serum albumin, change in pre-HD serum phosphorus, and rates of non-access hospitalization or death. Changes in blood pressure and erythropoiesis will also be assessed. Safety outcomes will focus on vascular access complications and burden of treatment. Data will be obtained on the cost of delivering frequent HD compared to conventional HD. Efforts will be made to reduce bias, including blinding assessment of subjective outcomes. Because no large-scale randomized trials of frequent HD have been previously conducted, the first year has been designated a Vanguard Phase, during which feasibility of randomization, ability to deliver the interventions, and adherence will be evaluated.

Swartz, R. D., E. Perry, et al. (2008). "Patient-staff interactions and mental health in chronic dialysis patients." Health Soc Work 33(2): 87-92.

Chronic dialysis imposes ongoing stress on patients and staff and engenders recurring contact and long-term relationships. Thus, chronic dialysis units are opportune settings in which to investigate the impact of patients' relationships with staff on patient well-being. The authors designed the present study to examine the degree to which perceptions of open communication between patients and staff affect patient mental health. A one-year, two-wave longitudinal survey assessed patient (N = 109) perceptions of the interpersonal environment and mental health. Assessments included sharing personal information (open disclosure), assisting one another (helping), staff respect for patients (respect), and hierarchical patient-staff relations (formal staff authority). Cross-sectional and longitudinal regression analyses examined how these characteristics of the interpersonal environment relate to depression and subjective well-being among patients. Multivariate analysis showed that open disclosure correlated independently with lower levels of depression at baseline (N = 109) and a predicted significant decrease in depression over time (N = 64). Other interpersonal characteristics did not correlate with depression or subjective well-being at

baseline or longitudinally. The interpersonal climate in chronic dialysis units influences patient well-being. Contrary to traditional views, open disclosure in patients' relationships with staff is not detrimental and contributes to well-being.

Taal, M. W., R. J. Fluck, et al. (2006). "Preventing catheter related infections in haemodialysis patients." Curr Opin Nephrol Hypertens 15(6): 599-602.

Tagay, S., A. Kribben, et al. (2007). "Posttraumatic stress disorder in hemodialysis patients." Am J Kidney Dis 50(4): 594-601.

BACKGROUND: We aim to assess the prevalence and severity of posttraumatic stress disorder (PTSD) in patients who receive long-term hemodialysis (HD) and investigate its correlation with depression, anxiety, health-related quality of life, and service utilization. STUDY DESIGN, SETTING & PARTICIPANTS: In a cross-sectional study, we recruited 144 HD patients (age, 63.1 +/- 14.2 years; 50.7% men) from 5 dialysis units. FACTOR: PTSD, defined in accordance with criteria of the Impact of Event Scale-Revised and Posttraumatic Stress Diagnostic Scale. OUTCOMES: Physical health, mental health, depression, anxiety, life satisfaction, service utilization. MEASUREMENTS: Impact of Event Scale-Revised, Posttraumatic Stress Diagnostic Scale, Hospital Anxiety and Depression Scale, Short-Form Health Survey. RESULTS: 77.8% of HD patients reported at least 1 traumatic event. The lifetime prevalence for PTSD, independent from trauma type, was 17%. PTSD prevalence only with regard to HD as a potential traumatic event was 10.4%. Women reported more helplessness and more intensive experiences of fear or horror than men with respect to the stressor A criterion. Patients with PTSD showed substantial decreases in mental health in comparison to patients without PTSD (P < 0.01). Additionally, greater depression, anxiety, less life satisfaction, and more service utilization were associated with greater posttraumatic symptoms. There was no correlation of physical health with posttraumatic symptoms. In partial correlation analyses adjusting for depression, associations between posttraumatic symptoms, mental health, and anxiety remained robust. LIMITATIONS: Generalizability to other settings, absence of control group, study power. CONCLUSIONS: PTSD is common in HD patients, but little work has been done to explore the variables associated with PTSD. Data suggest that PTSD is underdiagnosed and undertreated in HD patients. Interventions should target these patients with the goal to improve well-being and quality of life.

Tourret, J., I. Tostivint, et al. (2007). "Antiretroviral drug dosing errors in HIV-infected patients undergoing hemodialysis." Clin Infect Dis 45(6): 779-84.

BACKGROUND: Several studies have revealed the frequency of antiretroviral (ARV) drug prescription errors. We analyzed highly active antiretroviral therapy (HAART) prescribing practices for human immunodeficiency virus (HIV)-infected patients undergoing hemodialysis in France. METHODS: Prescribed ARV drug doses in our cohort (consisting of all HIV-infected patients who underwent hemodialysis from 1 January 2002 and were prospectively followed up until 1 January 2004) were compared with the recommended doses for patients undergoing hemodialysis. The log-rank test was used to compare the outcomes among different groups of treated patients. RESULTS: One hundred seven of the 129 patients in our cohort received a total of 317 ARV drugs, 59% of which were improperly prescribed. The dosing was too low for 18% of the patients and too high for 39% of the patients. Twenty-eight patients (26%) did not receive any of their ARV drugs at the

recommended dose. The lowest prescribed dose (8% of the daily recommended dose) was observed with indinavir and zidovudine, and the highest prescribed dose (1000% of the recommended dose) was observed with stavudine. Among patients who received HAART, those who were prescribed an insufficient dose of a protease inhibitor had more-severe HIV disease and worse 2-year survival than did the other patients (mean rate of survival+/-standard deviation, 79.5%+/-7.5% vs. 95.4%+/-2.6%, respectively; P<.02). For dialyzable ARV drugs, the delay between ARV drug receipt by the patients and dialysis sessions was not respected in 9% of cases, and in 73% of cases, it was not known whether the patients took the ARV drugs before or after dialysis sessions. CONCLUSION: This is, to our knowledge, the first study to show a significant association between ARV drug prescription errors and survival in patients undergoing dialysis.

Upadhyay, A., M. A. Sosa, et al. (2007). "Single-use versus reusable dialyzers: the known unknowns." Clin J Am Soc Nephrol 2(5): 1079-86.

The practice of reusing dialyzers has been widespread in the United States for decades, with single use showing signs of resurgence in recent years. Reprocessing of dialyzers has traditionally been acknowledged to improve blood-membrane biocompatibility and prevent first-use syndromes. These proposed advantages of reuse have been offset by the introduction of more biocompatible membranes and favorable sterilization techniques. Moreover, reuse is associated with increased health hazard from germicide exposure and disposal. Some observational studies have also pointed to an increased mortality risk with dialyzer reuse, and the potential for legal liability is another concern. The desire to save cost is the major driving force behind the continued practice of dialyzer reuse in the United States. It is imperative that future research focus on the environmental consequences of dialysis, including the need for more optimal management of disinfectant-related waste with reuse, and solid waste with single use. The dialysis community has a responsibility to explore ways to mitigate environmental consequences before single-use and a more frequent dialysis regimen becomes a standard practice in the United States.

Van Ha, T. G., D. Fimmen, et al. (2007). "Conversion of non-tunneled to tunneled hemodialysis catheters." Cardiovasc Intervent Radiol 30(2): 222-5.

PURPOSE: To determine the safety and efficacy of conversion of non-tunneled (temporary) catheters to tunneled catheters in hemodialysis patients. METHODS: A retrospective review of 112 consecutive conversions in 111 patients was performed over a period of 4 years. Fourteen patients were lost to follow-up. The remaining 97 patients had clinical follow-up. Temporary catheters were converted to tunneled catheters utilizing the same internal jugular venotomy sites and a modified over-the-wire technique with use of a peel-away sheath . Follow-up clinical data were reviewed. RESULTS: Technical success was achieved in all 112 procedures. None of the 97 patients with follow-up suffered early infection within 30 days. The total number of follow-up catheter days was 13,659 (range 2-790). Cases of confirmed and suspected bacteremia requiring catheter removal occurred at a frequency of 0.10 per 100 catheter days. Suspected catheter infection treated with antibiotics but not requiring catheter intervention occurred at a frequency of 0.04 per 100 catheter days. Frequency of all suspected or confirmed infections was 0.14 per 100 catheter days. Catheter interventions as a result of poor blood flow, inadvertent removal, catheter fracture, or kinking occurred at a rate of 0.18 per 100 catheter days. Life table analysis revealed primary patency rates of 86%, 64%, and 39% at 30 days, 90 days, and 180 days, respectively. CONCLUSION: Conversion of temporary catheters to tunneled catheters using the pre-existing venotomy sites is

safe and has low rates of infection and malfunction. These rates are comparable to previously published rates for tunneled catheters placed de novo and tunneled catheter exchanges.

Varela Lema, L. and A. Ruano Ravina (2007). "Effectiveness and safety of different hemodialysis modalities: a review." J Nephrol 20(5): 525-42.

BACKGROUND AND AIMS: At present, there are a number of hemodialysis (HD) modalities that appear to be superior to conventional HD. This study sought to compare and assess the effectiveness and safety of the various hemodialysis modalities. METHODS: Review of the literature: multiple electronic databases were searched, including Medline, EMBASE and Cochrane Collaboration. Papers were independently selected by 2 researchers. RESULTS: Thirty-five original papers were included. The outcomes of the largest randomized clinical trial undertaken (the Hemodialysis [HEMO] Study) showed that high- versus low-flux HD did not significantly reduce overall mortality ($p=0.23$) but did reduce the risk of hospitalization and death due to vascular causes by 10% ($p<0.05$). The results of the respective studies are controversial as to the benefits of high-flux HD on anemia, nutritional status or cardiovascular risk factors. The only study that provided mortality results for hemodiafiltration failed to observe significant differences between high- and low-flux HD. Similarly, there was no clear evidence of improvements in any of the other outcomes investigated. CONCLUSIONS: The results of this review do not allow for any conclusion to be drawn as to which HD modality is best in terms of mortality, morbidity and patients' quality of life. The different HD techniques do not show major improvements in any of the outcomes assessed, but these cannot be dismissed since the studies had multiple flaws and lacked long-term follow-up data. Better-quality studies are needed to establish which hemodialysis modalities are best suited to individual patients' specific clinical conditions.

Walters, S., C. Porter, et al. (2008). "Dialysis and pediatric acute kidney injury: choice of renal support modality." Pediatr Nephrol.

Dialytic intervention for infants and children with acute kidney injury (AKI) can take many forms. Whether patients are treated by intermittent hemodialysis, peritoneal dialysis or continuous renal replacement therapy depends on specific patient characteristics. Modality choice is also determined by a variety of factors, including provider preference, available institutional resources, dialytic goals and the specific advantages or disadvantages of each modality. Our approach to AKI has benefited from the derivation and generally accepted defining criteria put forth by the Acute Dialysis Quality Initiative (ADQI) group. These are known as the risk, injury, failure, loss, and end-stage renal disease (RIFLE) criteria. A modified pediatrics RIFLE (pRIFLE) criteria has recently been validated. Common defining criteria will allow comparative investigation into therapeutic benefits of different dialytic interventions. While this is an extremely important development in our approach to AKI, several fundamental questions remain. Of these, arguably, the most important are "When and what type of dialytic modality should be used in the treatment of pediatric AKI?" This review will provide an overview of the limited data with the aim of providing objective guidelines regarding modality choice for pediatric AKI. Comparisons in terms of cost, availability, safety and target group will be reviewed.

Webster, D. P., K. J. Jeffery, et al. (2007). "Investigation of hepatitis C transmission in a UK haemodialysis unit: possible role of Schribner shunt vascular access device." J Hosp Infect 66(4): 391-2.

Weiner, D. E., D. C. Miskulin, et al. (2007). "Reducing versus discontinuing erythropoietin at high hemoglobin levels." J Am Soc Nephrol 18(12): 3184-91.

A 2006 change in Medicare policy allowed reimbursement for erythropoietin (EPO) in dialysis patients whose most recent hemoglobin exceeded 13 g/dl. We investigated the effects of a change in dosing algorithm implemented in response to this policy, in which EPO dosages were reduced instead of temporarily discontinued for hemoglobin levels > or =13 g/dl. Among 1688 individuals in 18 hemodialysis units, the reduction protocol resulted in more hemoglobin levels > or =13 g/dl (P < 0.0001), fewer levels between 11 and 12.9 g/dl (P < or = 0.004), no difference in the proportion of levels <11 g/dl, and more EPO administered per session (P < 0.0001) than the discontinuation protocol. In view of the expense of erythropoiesis stimulating agents and the uncertainty of the safety of using EPO to achieve high hemoglobin targets, this study suggests that discontinuation, rather than reduction, of EPO treatment is appropriate when hemoglobin reaches 13 g/dl in hemodialysis patients.

Wikstrom, B. (2007). "Itchy skin--a clinical problem for haemodialysis patients." Nephrol Dial Transplant 22 Suppl 5: v3-7.

BACKGROUND: Uraemic pruritus affects many patients receiving chronic dialysis therapy for end-stage renal disease. It is a distressing symptom which has a negative impact on quality of life (QoL) of the patients. The condition is also very frustrating for both patients and physicians since no effective treatment for relief of the itch has been demonstrated. The pathophysiological mechanisms of pruritus are mainly unknown despite several hypotheses presented. Recent concepts refer to changes in the opioidergic system and derangements of the immune system. METHODS: In the Dialysis Outcomes and Practice Pattern Study (DOPPS I, 1996-2001) pruritus was assessed by a self-reported questionnaire. The relationship of pruritus to morbidity, mortality, QoL, sleep quality and patient biochemical laboratory data was studied in >200 randomly selected haemodialysis (HD) facilities in seven countries. Pruritus data were collected from >6000 HD patients. Analyses were adjusted for age, gender, race, Kt/V, haemoglobin, serum albumin, serum calcium, serum phosphorus, 13 comorbidities, depression, years on dialysis, country and facility clustering effects. RESULTS: Moderate-to-extreme itch was observed in 46% of prevalent HD patients. Differences in pruritus prevalence were found between countries (ranging from 38% in France to 55% in Italy) and facilities (5-75%). Pruritus was more common in patients on HD >3 months than in patients starting HD. A number of patients' serum characteristics, including high calcium, phosphorous and calcium x phosphorous product levels, were significantly associated with pruritus. Patients with moderate-to-severe pruritus were more likely to feel washed out and to have poor sleep quality, physician-diagnosed depression and a reduced QoL than patients with no or mild pruritus. A significant 15% higher mortality risk was observed in pruritic HD patients but this significance was not seen after adjusting the data for sleep quality measures. CONCLUSIONS: The self-reported prevalence of pruritus in HD patients is relatively high, 40-50%. Pruritus is associated with poor outcomes and a higher mortality risk, probably attributed to poor sleep quality. Better therapeutic treatments are needed for relief of distressing uraemic itching in HD patients.

Willms, L. and L. M. Vercaigne (2008). "Does warfarin safely prevent clotting of hemodialysis catheters? a review of efficacy and safety." Semin Dial 21(1): 71-7.

This article reviews the efficacy and safety of warfarin to prevent tunneled cuffed catheter (TCC) thrombosis in the hemodialysis population. Literature searches of PubMed, EMBASE, the Cochrane Library and Google Scholar were performed until April 1, 2007. Bibliographies of

relevant articles were reviewed for additional publications. Minidose (1 mg/day) warfarin is ineffective in preventing TCC malfunction. Warfarin titrated to an international normalized ratio (INR) of 1.5-2.0, 1.8-2.5, and 2.0-3.0 was found to decrease the rate of thrombosis in selected patients. Early initiation of warfarin after catheter placement may be advantageous. Despite evidence of efficacy, safety is of greater concern. There were no major bleeds reported at an INR range of 1.5-2.5 specifically in catheter studies. However, an increase in major bleeding episodes has been reported with INR ranging from 1.4 to 3.0 in patients receiving warfarin for other indications (e.g., graft patency or cardiovascular indications). There is insufficient evidence to recommend the routine use of warfarin to prevent TCC thrombosis in all patients, primarily because of safety concerns. There is an increased risk of bleeding associated with warfarin use in the hemodialysis population. If a decision is made to use warfarin on a case-by-case basis, literature to date suggests that an INR target of 1.5-2.5 should suffice. Bleeding must be monitored carefully in this population, especially in patients using antiplatelet medications for concurrent conditions.

Winkelmayer, W. C., J. Mehta, et al. (2007). "Benzodiazepine use and mortality of incident dialysis patients in the United States." Kidney Int 72(11): 1388-93.

Benzodiazepines and other omega-receptor agonists are frequently used for sleep and anxiety disorders. We studied the rates, correlates, and safety of individual benzodiazepines and zolpidem use from the records of 3690 patients in a national cohort of Dialysis Morbidity and Mortality Study Wave 2 data. We assessed drug utilization and an association between drug use and all-cause mortality. Overall, 14% of incident dialysis patients used a benzodiazepine or zolpidem. Women, Caucasians, current smokers, and patients with chronic obstructive pulmonary disease were more likely to use these drugs, whereas patients with cerebrovascular disease were less likely to use these drugs. In adjusted analyses, benzodiazepine or zolpidem use was associated with a 15% higher mortality rate. Chronic obstructive pulmonary disease significantly modified this association, suggesting that these patients were at higher risk. No association was found between benzodiazepine use and greater risk for hip fracture. We conclude that benzodiazepine or zolpidem use is common in incident dialysis patients and may be associated with greater mortality. Further studies are needed to elucidate the safety of these drugs in the dialysis population, which may lead to cautious and restrictive utilization of omega-receptor agonists in dialysis patients.

Wintz, R., B. Rosenthal, et al. (2008). "The Physician Quality Reporting Initiative: a practical approach to implementing quality reporting." Adv Chronic Kidney Dis 15(1): 56-63.

The Physician Quality Reporting Initiative (PQRI) is a voluntary program in which Medicare encourages eligible physicians in the United States to report on specific quality measures. This article is a case study of the implementation of PQRI reporting by Kidney Associates, a nephrology practice in Houston, TX. After reviewing and discussing 74 potential measures, the group narrowed the selection to 5 and chose 1 office measure and 2 dialysis measures. PQRI reporting was established through an Encounter Note template that forced a required entry for whether a patient was diabetic. For each diabetic, blood pressures were entered in the template and appropriate G-codes were created, which were then selected and linked with the diabetes International Classification of Diseases, Ninth Revision code and electronically submitted for billing. The dialysis measures were automatically selected from the urea reduction rate and hematocrit (hemoglobin x 3) measures that were received for each patient on a regular basis from a large dialysis chain. Software was developed to parse these data, evaluate them, and generate the appropriate G-codes. At the end of the billing cycle, these data were exported through a standard

spreadsheet formatting along with the billing G codes, and claims were submitted. The system was cost-effective to implement, required minimal education, and achieved 100% cooperation through feedback education and rapid correction of systems issues. Kidney Associates was able to show that PQRI reporting is easy to implement with minimal expense and staff labor. Sharing these methods with other practices should facilitate the implementation of efficient reporting systems.

Wittmann, A., F. Hofmann, et al. (2007). "Needle stick injuries--risk from blood contact in dialysis." J Ren Care 33(2): 70-3.

This paper will examine the experience of Needle Stick Injuries (NSI) in Germany. There is evidence that these experiences have relevance for the whole of Europe. The protective measures described in this paper are important for the safety of all health care workers. This paper will describe incidents of NSI with reference to sero-conversion after the incident. The protection of health care workers is of prime importance and this paper will discuss the most successful methods of protection. The paper will examine briefly the cost of these protective measures.

Yeh, S. C. and H. C. Chou (2007). "Coping strategies and stressors in patients with hemodialysis." Psychosom Med 69(2): 182-90.

OBJECTIVES: To investigate the stress related to undergoing hemodialysis (HD) and the relationship between these stresses and the coping strategies used by patients with end-stage renal disease. METHODS: We used the Hemodialysis Stressor Scale and the Jalowiec Coping Scale to interview 2642 patients (mean age = 57 years; 53.5% female) receiving HD. The Hemodialysis Stressor Scale measures the level of stress related to stressor subscales: daily activity, physical condition, dependency on medical staff, fluid and food restriction, role ambiguity, blood vessel problems, and reproductive system functioning. The Jalowiec Coping Scale identifies the use of the following coping strategies: problem-oriented, emotion-oriented, support seeking, avoidance, and isolated thoughts. Data were analyzed using Hierarchical Linear Modeling. RESULTS: Daily activity subscale scores were positively associated with using emotion-oriented, avoidance, and isolated thoughts as coping styles and negatively related to support seeking from professionals. The higher the perceived stress related to physical symptoms, dependency on medical staff, and blood vessel problems, the more the patients used emotion-oriented, support seeking, avoidance, and isolated thoughts to cope. Fluid and food restriction and role ambiguity subscales were found to be positively associated with emotion-oriented, avoidance, and isolated thoughts coping strategies. Reproductive system functioning was positively associated with emotion-oriented, avoidance, and isolated thoughts coping strategies. Patients on HD seldom use problem-oriented strategy to ease their stresses. Support seeking was another infrequently used coping strategy. CONCLUSIONS: The most commonly used coping strategies in our patients were emotion-oriented, avoidance, and isolated thoughts. The choice of coping strategy depended on the types of stressor.

Yevzlin, A. S., R. J. Sanchez, et al. (2007). "Concentrated heparin lock is associated with major bleeding complications after tunneled hemodialysis catheter placement." Semin Dial 20(4): 351-4.

Vascular access complications, including thrombosis, are associated with significant patient morbidity and mortality. Currently, up to 60% of new patients and 30% of prevalent patients are using a catheter for dialysis. To prevent interdialytic catheter thrombosis, these devices are routinely locked with concentrated heparin solutions. Several recent studies have elucidated the potential for abnormal coagulation markers (aPTT) that may arise from this practice. This abnormal elevation in aPTT may be explained by significant early and late leakage from the catheter that

occurs after performing a catheter lock. To date no study has evaluated the impact of this practice, or the elevation in aPTT that may result from it, on bleeding complication rates. We conducted a retrospective analysis comparing bleeding rates in subjects who received concentrated heparin catheter lock (5000 u/cc) [group 1, n = 52] to those who received citrate or dilute heparin catheter lock (1000 u/cc) [group 2, n = 91] immediately after tunneled hemodialysis catheter insertion. Baseline characteristics did not differ between the groups except for the preprocedure INR, which was higher in the postpolicy group compared with the prepolicy group (1.29 vs. 1.21, p = 0.04). Results from logistic regression analyses revealed that the likelihood of a composite bleeding event in group 1 was 11.9 times that of a composite bleeding event in group 2, p = 0.04. Concentrated heparin (5000 u/ml) is associated with increased major bleeding complications posttunneled catheter placement compared with low-dose heparin (1000 u/ml) or citrate catheter lock solution, p = 0.02. Given the findings of this study, a randomized controlled trial comparing the safety and efficacy of common anticoagulation lock solutions is warranted.

Zeigler, S. A. (2007). "Prevent dangerous hemodialysis catheter disconnections." Nursing 37(3): 70.

Zyga, S. and G. Tourouki (2006). "Tuberculosis in haemodialysis: a problem making a comeback." J Ren Care 32(4): 176-8.

Tuberculosis (TB) accounts for a significant proportion of all deaths by infectious diseases. Controlling tuberculosis is a major public health issue especially in the developing nations, where the rise of the disease's incidence varies between 5-30% and the rise reaches reduplication every 5-10 years. The consequences of the disease in renal dialysis patients vary between 3.7-6%, thus being 12-15 times higher than the rest of the population.