Author, Year	LoE †	Aim/Purpose	Design / Methods / Interventions	Sample & Setting	Major Variables / Outcomes	Data Analysis	Strengths / Limitations	Relevant findings
Research related to Capacity and Patient Access times								
Béchard, S., et al. (2017).	IV	* Implementation & evaluation of integration of NPs on Pt access to care & medical management	* Implementation of program to add / increase scope of NPs * Pre/post program analysis	* Canadian Hosp HFC * 289 Pts in 2012-13 (pre); 391 in 2013-14 (post)	* Total Pts * Monthly visits * Clinical profile * Pharm profile	* t-test for pre/post characteristics * Run charts for total & monthly visits	S: Detailed pre/post analysis L: One specific Hosp, on general type of Pt	* 35% ↑ in number of Pts actively followed & significant ↑ median number of monthly visits (79 [57-97] between 2012-13 vs 155 [125-172] between 2013-14 * No SS significant change in Pt clinical & pharm profile & results * Introduction of NPs increased access while maintaining quality of care
Bungard, T. J., et al. (2009)	IV	* Implementation & evaluation of new program to improve Card Consultation Appt wait times	* Implementation of improved Card access time program * NP staffed single intake point for triage * Consultative team: Cardiologist, NP, PharmD * Historical control cohort design	* Canadian Card Clinic * Pre-implementation 3/2003-6/2003 (n=311); 1/2004-12/2006 post (n=3096)	* Primary outcome: time to initial consultation * Secondary: time to definitive diagnosis	* t-test for pre/post * Multivariate linear regression to check influence / adjust for baseline imbalances in SS covariates	S: Size, Rigor of analysis L: Non-RCT trial; confounding Vars; similar pre/post Pt characteristics but large difference in n	* ↓ time to initial Card consultation from 71±45 days to 33±19 days * ↓ time to a definitive diagnosis from 120±86 days to 51±58 days) *Annual referrals ↑ from 1512 in 2002 to 2574 in 2006 * No SS differences in pre/post Pt characteristics
Butcher, L. (2017).	IV	* Implementation & evaluation of strategy to address market share loss, driven by PCP on call demands, by implementing a NP HS program	* Implementation and evaluation of new NP HS program * 3 NP HS added to provide 24/7 coverage with 7-7-7 model. * Pre/post analysis	* Small rural Hosp in U.S.	* Primary outcome: admissions	* Run chart for admissions, Pt Sat, NP HS turnover, costs	S: Thorough analysis of QI L: Small Hosp, potentially limited generalizability	* ↑admissions to 417 in 2016, a 23% ↑ from 339 low in 2014 * ↑ Pt Sat from 61% before the NP HS program to 74% * Lessons learned including considering a phased in approach, challenges in NP HS establishing boundaries, initial higher NP HS turnover
Kwong, T. (2016)	IV	* Implementation & evaluation of program adding NP scope to reduce specialty consultation Appt wait times	* Implementation of new practice scheduling processes plus addition of dedicated NPs with increased scope of practice * Pre/post program analysis	* Card/vascular Specialty clinic, 1/2014-6/2014 * 5500 annual Pts, pre/post not provided	* Primary outcome: wait time for consultation Appt * Secondary: Pt Sat	* Run chart of % Pts with Appt within 7 days	S: NP role detail L: One center, lack of detail data, likely confounding Vars	* 50% of new Pts seen in 7 days of referral post-implementation, pre-implementation was 3-4 weeks * ↑ in Pt Sat
Wells, M., et al. (2017)	IV	* Implementation and evaluation of program to redesign HS role & add NP HS to address rising demand & increased admission wait times	* Program implementation using series of Lean quality improvements from multiple PDSA cycles * Process improvements / addition of NP HS * Pre / post analysis	* Large Hosp in U.S. * 6284 Hosp admits from 1/2013 -6/2014 (pre-program) vs 6415 from 7/2014-10/2015 (pos-program)	* Daily admits, ED admit wait time, cost per discharge	* LEAN analysis of admission process * Multiple PDSA cycles * t-test & X2 for pre-post data * Run charts	S: LEAN methodology & analysis L; One center, potential confounding factors, potential Hawthorne effect	* Admitting capacity ↑ (22 to 30/day) * Emergency department mean Pt wait times for admission ↓ 36% (66 to 43 min) * Expenses ↑ due to new NPs, but discharges /month ↑ at faster rate, leading to 49 % ↓ cost/discharge ($367 to 187) * Limited data showed ↑ provider Sat

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Research related to Expanded NP Scope and Patient Outcomes								
Atzema, C. L. (2018)	IV	* Analysis of relationship between timing of HF related hospital discharge f/u to mortality and Readmt	* Retrospective cohort analysis	* Canadian ED from 4/2007 to 3/2014 * 16,274 Pts with f/u care within 7 days and 28,846 within 30 days	* 1-year rate of mortality * 90-day Readmt rate	* Univariate comparisons 1-way analysis of means variance, Kruskal–Wallis test for medians and $\chi 2$ test for proportions	S: Size, rigor of analysis L: Cohort analysis versus RCT	* 7-day f/u cohort ↓lower rate of 1-year mortality over 1 year, HR 0.92 (0.87–0.97) * 7-day f/u cohort ↓ 90 day Readmt rate, HR 0.87 (0.80–0.94)
Baky, V., et al. (2018).	IV	* Implementation & evaluation of new program to reduce readmission rate for ACS Pts	* LEAN QI project with 3 new processes: (1) Improved pre-discharge follow-up Appt (Appt in 1-2 weeks), (2) Pharmacist medication education, (3) Timely discharge planning * Pre/post program analysis	* Card step-down unit at a single Hosp from 2015 to 2016 * Convenience sample - 578 Pts, 402 were diagnosed with ACS	* Primary outcome: all-cause rate of Hosp readmission within 30 days	* Pre/Post Multivariate analysis for factors predictive of readmission rate	S: Rigor of analysis L: Convenience sample, differences in pre/post implementation Pt characteristics	* Readmission rate 14.2% for Pts with heart failure; 7.5% for Pts with ACS * Overall readmission rate similar following the 3 interventions, but Pts with pre-scheduled follow-up Appt had 0.374 ↓ odds of being readmitted * Pre-scheduled timely follow-up Appt associated with reduced readmission rate
Kapu, N. A., et al. (2014)	IV	* Implementation & evaluation of quality & financial impact of adding NP inpatient care teams	* NP's were added to 4 ICU teams and 1 progressive care team * Retrospective, secondary analysis of return on investment after adding NP HS	* Large academic Hosp * 4 ICU (surgical, Card, neuroscience, & medical) & 1 step-down NP teams	* Billing, acuity, LOS, & NP-associated quality metrics	* Comparison of billing data, acuity, LOS for designated years before & after adding NPs * NP-associated quality metrics	S: Thorough data analyses L: One center; pre / post acuity similar but potential other confounding factors	* Revenue vs expenses was ↑ for NP teams (from ↓ in compensation & care cost): $28M/year savings * Average risk-adjusted LOS for the 5 time periods after adding NPs ↓ and charges ↓ * Most clinical outcomes ↑ beyond pre-project baselines * No SS acuity differences in measurement periods
Navarro, M. J., et al. (2017)	IV	* Analysis of relationship between wait time for initial Card Appt compared to no-shows	* Retrospective cohort analysis	* Large Card clinic, 2-week period (6/2015), 228 Pts	* Wait times for initial Appt, No-Show Appts	* Binary analysis comparing no-show rates between Pts with wait time < 2 weeks & > 2 weeks	S: Effect size of results L: One center, limited size/time, confounding Vars	* Significantly ↓ (5.8%) no-show rate in < 2 week wait time group compared with 29.1% in > 2 week wait time group
Tanguturi, V. K. (2016)	IV	* Implementation & evaluation of program to reduce PCI Readmt rates including 2 week d/c f/u	* Implementation of bundle of interventions targeting PCI pre d/c, post d/c, and re-presentation to the emergency department * Pre/post program analysis	* Large tertiary health center in Massachusetts * Avg of 1000 PCI / yr *2011 (implementation) to 2015	* 30-day Readmt rate	* Run chart of monthly Readmt rates	S: Size, length, effect size of results L: One center, confounding Vars	* Significantly ↓ in index hospital readmission rate, from 9.6% prior program implementation to 5.3% after 4 years

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Southey, D., et al. (2014)	IV	* Implementation and evaluation of Pt impact following introduction of NP HS coverage for Card ward, including weekends	* Addition of NP HS Card coverage * Prospective cohort * Pre/post analysis	* Card Pts operated on from 1/2005 to10/2011 * Pts before NP HS (n= 2385) & after (n=3910)	* ICU readmission, Survival after surgery, Mortality	* Mean, standard deviations for p calculation * Logistic regression on predictors of survival	S: Large, long term analysis L: Cohort analysis versus RCT, possible for confounding vars	* ↓ in rate of Card ICU readmission, 2.6% to 1.9% & ↓ LOS, 10 to 8 days * ↑ in overall survival after Card surgery, 96.5% to 98.0% * Presence of NP HS strongest predictor of survival with OR 1.9 (1.23–3.01) * No major SS differences in cohorts
Van Deventer, J. D., et al. (2015)	IV	* Implementation & evaluation of new Card access model to improve access	* Implementation of decentralized program to improve Appt access times * Pre/post program analysis	* Card Pts in one S Africa region, 121 Pts 5/2013 – 5/2014 (post); 64 Pts 10/2012-4/2013 (pre)	* Time to initial Appt, time to diagnosis, Pt compliance with Appts	* Mann-Whitney test for pre/post comparisons	S: Strong data analysis L: Potentially not applicable to many situations	* Significant ↓ in waiting times, 85 days to 18 days * Pt compliance with appointments significantly ↑, 90% vs. 56% * No SS differences in pre/post Pt characteristics
Research related to NP & MD Job Satisfaction								
Athey, E. K., et al. (2016)	IV	* Analysis of how NP autonomy & work setting predict job Sat	* Survey data: satisfaction scale ranges from 1 (very dissatisfied) to 4 (very satisfied).	* 2012 National US Survey of NPs (n = 8311)	* Job Sat, autonomy, work setting	* Bi & multi variate relationships between setting & 3 autonomy Vars (NP skill utilization, independent billing, MD relationship) & job Sat	S; National, size L: Lack of detail; Autonomy measures not validated	* NPs in primary care reported highest levels of autonomy, NPs in Hosp surgical areas reported lowest levels * Autonomy was most predictive of satisfaction by significant margin (avg Sat 3.5 vs 2.6 for high vs low autonomy) * Work setting on it is own only marginally related to job Sat
Bush, C. T. & B. Lowery (2016)	IV	* Evaluation of postgraduate NP education programs on NP job Sat, clinical competency, Pt Sat	* Nonequivalent group study to compare job Sat scores among a convenience sample of 2 NPs groups using MNPJSS	* Convenience sample of 2 groups of diverse NPs (182 total): one with formal postgraduate programs, one without	* MNPJSS categories	* t-tests: job Sat between groups & demographics * Multiple linear regression on job Sat, experience, environment, postgraduate education	S: Rigor of approach, diverse sample L: nonprobability sampling techniques with bias risk	* Postgraduate education has SS ↑ impact on NP job Sat * Factors influencing autonomy were largest contributors to NP job Sat for both study groups * Having > 3 years' experience was also a SS positive influence on job Sat but was more important for NPs without postgraduate education programs
Hoff, T., et al. (2017).	V	* Analysis of literature related to Sat, burnout, stress, & Turnover of NPs	* PRISMA Systematic Review * Search of PubMed, PyschInfo, Business Source Complete, CINAHL, & the Cochrane Review databases 2000 to 2016	* 32 articles, variety of settings * Variety of job Sat scales used – 7 included MNPJSS	* Job Sat, burnout, stress, intent to leave organization	* Low heterogeneity across studies limited analysis results, No MA possible	S: Through PRISMA driven approach L: Heterogeneity across studies limited results	* Lack of robust research found * Generally lower levels of Sat across sample & higher intrinsic versus extrinsic Sat levels * NP role expansion experienced in positive & negative ways * Potential policy or managerial changes required but more research needed

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Hagan, J. & D. L. Curtis (2018).	IV	* Examination of relationship of MNPJSS Sat factors & demographic characteristics with NP retention	* NP Survey to members of the Texas NP Organization.	* 350 NP's from Texas NP Organization	* Years experience * Years at current position * Intention to leave position within 5 years	* Linear regression for factors with duration in current position *Logistical regression for factors with intent to leave	S: Use of proven MNPJSS scale L: Survey style, small size, one state	* Years' experience, salary, & benefits were significantly associated with longer duration of current employment * Higher challenge/autonomy & higher annual salary were associated with significantly lower odds of intention to leave the current position
Johnson, J. H. (2011)	IV	* Implementation & evaluation of a Card NP HS role	* Program implementation of Card NP HS * Monthly result tracking	* Large 1,171 bed urban academic medical center * Growth from 2 to 31 Card specific NP HS over 14 years, with a range of experience	* Growth of program, Pt & MD Sat	* Description of program implementation * Run chart for growth, Sat	S: Thorough description of program L: One specific large academic medical center	* Card NP role evolved as a result of a focused effort at expanding NP HSs * Strategies included strong administrative support, practice relationships, advanced knowledge/skills, & role modeling * Strong yearly growth in number of Card NP HS plus consistently high Pt & MD Sat
Kartha, A., et al. (2014)	IV	* Analysis of NP & PAs roles in Hosp medicine	* Observational cross-sectional cohort study * Survey of Chiefs of Medicine & Nurse Managers for inpatient medicine scope of practice for NPs PAs & perceived healthcare quality	* 118 Chiefs of medicine & 198 nurse managers at 124 VA Hosp * 23% used NPs only; 13% PAs only; 12% used both; 52% neither	* Employment of NPs or PAs * Scope of Practice * Perceived healthcare quality	* Bivariate unadjusted & multivariable adjusted analyses	S: Multi-center survey L: VA only; potential survey bias; no clinical outcomes & cost effectiveness data	* Daily NP HS caseload at 4 to 10 Pts (mean 6.5 Pts) * 58.9% of NPs & 65.4% of PAs functioned primarily autonomously; 23.1% of NPs & 30.8% of PAs worked directly with MD, cowriting orders & making care decisions with MD * NPs associated with ↑ positive Pt discharge & coordination
McDonnell, A., et al. (2015)	VI	* Implementation and evaluation of NP HS roles on Pts, staff, & organizational outcomes	* Addition of NP HS roles into medicine (3 NP HS), surgery (2 NP HS) and orthopedics (1 NP HS) * Collective Qualitative Case Study	* District Hosp England, 2011–2012. * 13 strategic stakeholder interviews * Purposeful sample: 32 nurses, managers, MDs, team members & Pts	* Themes: Impacts on Pts, Impact on staff, Impact on organization	* Interviews * 3 mixed method case studies in clinical areas with NP HS * Included non-participant observation	S: Consistency among case study themes L: Interview, qualitative approach may not be generalizable	* NP HSs had ↑ impact on Pt experience, outcomes & safety * Staff knowledge, skills & competence were enhanced * Quality of working life, distribution of workload & team-working ↑

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Panagioti, M., et al. (2018)	V	* Review of evidence on consequences, causes, & EBP interventions for burnout in cardiologists	* Literature review and survey	* 2012 survey of 7288 MDs with extrapolation of cardiologist data	* Major themes: Bureaucratic tasks, work time, computerization, lack of autonomy, training demands	* Extrapolation of cardiologist factors from larger overall MD survey in combination with recent cardiologist specific lifestyle report	S: Large sample size L: Extrapolation of cardiologist specific data	* Burnout in cardiologists is associated with poor healthcare outcomes for Pts * Burnout driven by excessive workload, role complexity, training demands, inefficient compensation model, lack of resources, computerization, loss of autonomy, & difficulties balancing work, personal life
Pasarón, R. (2013)	VI	* Analysis of NP job Sat & association with extrinsic & intrinsic characteristics	* Descriptive-correlational design using survey methodology * Utilized MNPJSS & two investigator-developed Surveys (NP Snapshot Survey, Physician NP Survey)	* Nonprobability convenience sample of NPs & collaborating MDs at one pediatric Hosp * 17 NPs, 22 MDs	* Themes: autonomy, professional interaction & growth; time; benefits	* Cronbach's alpha coefficients for internal reliability * Multiple regression, paired t-tests	S: Approach / analysis rigor & proven scale L: Small sample size; one center, one specialty	* Overall NPs minimally satisfied with job * Dissatisfaction areas included professional & monetary recognition, assertive influence, administrative support & collegial relationships
Ryan, M. E. & D. W. Ebbert (2013)	VI	* Analysis of NP opinions regarding job Sat & barriers	* Descriptive, nonexperimental survey method using MNPJSS	* 522 NPs in 2 states – randomly sampled from state BON listings * 120 returned survey	* Multiple intrinsic & extrinsic Sat variables	* Frequency evaluation of 44 survey questions for intrinsic & extrinsic factors	S: Proven scale L: Not national, relatively small size, potential self-selection bias	* Scores revealed minimal global job Sat * Highest scores included time for direct Pt care, autonomy, & challenge * Dissatisfying factors involved reward opportunities, bonus availability, & research involvement
Travis, A. & B. Oliver (2017)	VI	* Analysis of structural empowerment & Job Sat of Card NPs	* Survey using "Conditions of Work Effectiveness-II Scale" (CWEQ-II) & "Job Satisfaction Subscale" (JSS) of the Michigan Organizational Assessment Questionnaire	* 116 Card NPs representing multiple states * Surveys obtained at Card conference	* Overall Job Sat * Opportunity, Resources, Information, Support, Formal / Informal power	* Frequency eval for survey * Linear regression for correlation of factors	S: Detailed proven scales; diverse sample L: Small sample, potential for survey selection bias	* NPs perceived moderate empowerment * NPs job Sat similar to overall population * "Opportunity" subscale had highest scores * "Resources" subscale had lowest * NPs perceived greater informal power than formal power * Correlation between structure empowerment & job Sat
Research related to Implementation of Expanded NP Scope								
Bryant, S. (2018).	VI	* Implementation & review of a HS-focused educational model for NPs	* New HS-focused NP education program,	* Site Specific AGACNP program	* Number of successful graduates	* No specific data analysis * Description of program & overall results	S: Applicable program L: Not research, rather an applicable program description	* 5 years of success for AGACNP HS education
Burleson, D. (2014).	VI	* Examination of NP & MD HS & Pt perceptions of	* Observational case study	* Two tertiary care Hosp * Similar characteristics,	*Communication challenges themes	* NVivo 91's coding process for theme analysis	S: 5-year analysis with appropriate	* During interviews, HS reported their communication challenges related to Pts & their families.

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		communication challenges * Examine how the challenges affect HS	* Group/individual Interviews of Hosp Administrators & HSs * Observation of HS interactions with one another & other medical personnel * Interviews of staff who surveyed & interviewed Pts	plus both implemented HS about 10 years ago * Conducted over 5 years * Used purposeful & convenience sampling			observational study rigor L: Two Hosp, limited sample; Indirect Pt information	* In group sessions, HS reported <1/3 of their communication challenges related to Pts & their families. * Potential need to allow more open HS communication * Comparison of Pts' & HSs' perceptions demonstrated critical gaps in Pt education that affect Pt care & trust in caregivers
David, D., et al. (2018)	VI	* Analysis and comparison of HF Pt discharge instructions written by NPs vs MDs	* Descriptive comparative design * Blinded retrospective medical records review	* 50 HF Hosp Pts (location not provided) * Instructions written by NP (n 31) & MD (n 19) * Subset from a larger investigation	* Self-Care maintenance & symptom perception Vars in discharge document	* Content analysis to evaluate presence HF self-care components in discharge document * 2 blinded PhD-trained researchers independently reviewed documents	S: Detailed documentation analysis L; Content analysis approach, subset of large study at single center	* NPs placed greater emphasis on symptom identification, & were more likely to advise & schedule follow-up appointments with PCP & Card providers * No SS differences in Pt characteristics among NP, MDs
Hurlock-Chorostecki, C., et al. (2014)	V	* Analysis of NP HS role & its enactment within interprofessional teamwork	* Scoping review utilizing providing quality summaries of existing research & non-research knowledge * Explored primary research, reviews, & gray literature from 1/2005 – 7/2012	* 29 articles for NP review, 19 for Interprofessional concepts review	* Themes: role integration, workforce description, role outcomes, & role perception	* Hosp-based NP literature thematically summarized * Interprofessional concepts from literature, mapped to the NP studies	S: Extensive literature review L: Lack of heterogeneity in research	* Understanding of NP HS role remains limited due to lack of research & standardization of NP HS role title * Inconsistent concepts within NP HS research * Research on role enactment needed to understand the uniqueness of NP HS role

ACS, Acute Coronary Syndrome; Appt, Appointment; BON, Board of Nursing; Card, Cardiology; d/c, Discharge; EBP, Evidence Based Practice; f/u, Follow-up; HR, Hazard Rate; HF, Heart Failure; HFC, Heart Failure Clinic; HS, Hospitalist; Hosp, Hospital; ICU, Intensive Care Unit; LOS, Length of Stay; L, Limitations; MA, Meta-Analysis; MD, Medical Doctor; MNPJSS, Misener Nurse Practitioner Job Satisfaction Scale; NP, Nurse Practitioner; OR, Odds Ration; Pt, Patient; PCI, Percutaneous Coronary Intervention; Pharm, Pharmacological; PA, Physician Assistant; PDSA, Plan-Do-Study-Act; PCP, Primary Care Physician; QI, Quality Improvement; Readmt, Readmission; Sat, Satisfaction; SS, Statistically Significant; S, Strengths; Vars, Variables

† Evidence rating based on scale from Ackley, B. J., Swan, B. A., Ladwig, G., & Tucker, S. (2008). Evidence-based nursing care guidelines: Medical-surgical interventions. (p. 7). St. Louis, MO: Mosby Elsevier.