Appendix A

Extraction Tables for the Barriers Identified in 14 Articles Categorized Using the Socio-Ecological Models

		Barriers		
Author (year), Country Focus	**Methodology Design, Sample, Data Collection & Analyses**	**Individual**	**Organizational, Social, Cultural & Policy**	**Environment**
Poghosyan, et al., (2013) USA Facilitators and Barriers for Primary Care Nurse Practitioners	**Design:** Qualitative descriptive **Sample:** Purposive sampling- 23 NPs **Data Collection:** 1. group interview guide developed by authors (*n* = 7) 2. individual interview guide used (*n* = 16) **Data Analyses:** Thematic analysis	Comprehension of NP role: administrators, physician, staff, and patients did not have clear understanding of NP role and Scope of practice.	Getting to know the patient hindered by organizational processes related to patient scheduling. Challenging to care for patients on a shifting basis. There is no NP's patient panel NP role in some clinics not clearly defined. NP and did not receive assistance from medical assistants or other nurses <u>Stressor in workplace:</u> General stressors -lack patient-care support, lack of access to medical organizational supports, poor relations with some physicians and practice administration & little or no representation of NP involvement in decision-making & no one to advocate the creation of organizational structure to promote Scope of Practice for NP regulations require supervision by physician NP has to wait for doctors to sign off. Organization forced to complete forms to maximize reimbursement rather than tracks who provided care. Policies and billing practices main challenges. Only one primary care person could be listed in chart.	
Steinke et al., (2017)	**Design:** quantitative - Cross sectional	Lack of support from nursing colleagues (colleagues may feel	Key barrier lack of respect from supervisors and physicians	

To examine job satisfaction among NP & APNs in developing and developed countries, and to provide insight re the barriers and facilitators for NP and APN. The quantitative results will not be presented because this survey measures job satisfaction primarily. However the authors did capture some insights about the barriers in the open-ended questions at the end of the survey.	descriptive **Sample:** Purposive sampling 1680 completed the survey, N=1419survey analyzed, 85% female, 60% between 42-60 years, most practiced less than 6 years. Participants from 19 countries. **Data Collection:** Invitations sent via ICN nurses Survey tool (modified Misener Nurse Practitioner Job Satisfaction Scale (MNPJSS) had some open-ended questions **Data Analyses:** Thematic analysis Also did linear regression for quantitative data	threatened by emerging of APN roles)	Management not accepting APN. Lack of dual role position (e.g. teaching at university and having a practice. Lack of support for obtaining doctorate degree) Increase in administrative tasks which decreased patient contact and increased workload Lack of vacation pay, retirement and leave policies	
Chapman et al., 2018 California To describe how PMHNPs utilization, identify barriers to full utilization, and assess PMHNPs' economic contribution in public behavioral health systems. Legend: Psychiatric Mental Health Nurse Practitioners =(PMHNPs)	**Design:** Mixed method **Sample:** Convenience sample of mental health & medical directors, PMHNPs, Managers (i.e. HR, quality, finances & billing) **Data Collection:** Semi-structured interviews (in person & over phone) **Data Analyses:** Thematic analysis Quantitative - Data on billing and finances collected and analyzed		Lack of appropriate job descriptions lack of county- approved open positions for the role Lengthy civil service processes for hiring PMHNPs in contract position expressed dissatisfaction of not receiving benefits that psychiatrists receive) Health directors did not understand the details of NP supervision Psychiatrists refusing to supervise PMHNPs Restricted scope of practice for NPs in California (law requires MD supervision)	
Sharp & Monsivais, 2014 Texas	**Design:** qualitative Ethnography **Sample:**	Lack of business skills and knowledge needed to manage clinic ownership.	NP clinic continue to depend on private pay patients, third person payment, and other	

To describe difficulties related to the business-related aspects of practice in role transition of rural (NPs), and to provide implications for practice. Conceptual framework: developed by Sharp (2010)	24 rural NPs, female 93%, 51-60 years old, over 20 years of practice recruited from the National Health Service Corps Database. **Data Collection:** Semi-structured interviews **Data Analyses:** Constant comparison analyses 3 main themes: Scope of practice, business skills, & role conflict	Role conflict experienced between taking care of patients and managing the clinical practice. Anxiety, uncertainty, stress during transition.	government funding. Some states permit NPs to practice independently, others require the supervision or collaboration of a physician. NP underutilized because of state nursing acts. Reimbursement for NP differ from physicians resulting in decreased income	
Kraus & Dubois, 2016 USA To explore the attitudes of NP & physicians related to the independent practice of NP	**Design:** Qualitative grounded theory **Sample:** Purposive sampling 15 physicians & 15 NPs working in academic and private primary care **Data Collection:** Semi-structured in-depth interviews **Data Analyses:** Constant comparison- led to themes and interpretations	For physicians' caveats included knowing your limits, experience and training "NP should know when to ask questions" Most physicians insisted on some degree of supervision to ensure patient safety, given perceived gap in NP training Both groups Both groups rejected the idea that the physician must be a hovering presence to ensure good care quality.	Barriers to independence: Physicians focus on NP independence was very patient- oriented and not self-promoting or defiant. Physicians less frequently than NP referenced laws that did not seem reasonable and did not optimized NP ability to provide the care they saw as part of their SOP. NP also slimily referenced arbitrary laws and practice restrictions that seemed unreasonable for safe and efficient care.	
Guzman, Ciliska, & DiCenso (2010), Ontario Canada To identify barriers and facilitators associated with the implementation of the NPs role in Ontario's public health units, & NPs' job satisfaction- and the relationship	**Design:** Quantitative Descriptive **Sample:** 28 NPs working in 36 Ontario public health units (96.5% response rate) Female, 36 -45 years of age, BScN degree and post-baccalaureate NP **Data Collection:** postal survey **Data Analyses:** Descriptive	Response to short answer questions Themes to emerge was "related to professional isolation" (25%), 3.6% working on their own, & not being part of team 27% Most frequent barriers specific to the relationship between NPs & physician were: unwillingness of specialists to accept referrals from NPs (53.5%), physician lack of understanding of the	Percentage who ranked barriers as the top ranked barrier 39.2% being only NP working in unit. 32.1% salary of NP 32.1% employer knowledge of NP role 28.5% time travelling home to practice 21.2% employer support of NP role 14.2% receiving clerical support 14.2% dealing with client's complex social issues 10.7% NP coverage	

between NP job satisfaction and practice dimension	statistics & several survey questions required short answers, authors coded themes	NP role (42.8%), the personality & philosophy of the physicians (35.7%) The most ranked barriers related to the relationship were: unwillingness of specialists to accept referrals from NPs (53.5%), lack of respect shown by the physicians (46.4%), NPs feel overwhelmed by the demands of their role given their solitary work environment, & isolation from other PHU staff., & some PHU employer may perceive the PHU NP role to become more of a physician replacement.	(vacation or illness) 10.7% union membership. 7.1% NP involvement in developing NP role. 3.6% being consulted by PHU staff, access to PHU programs, NP linkage to PHU programs, working with PHNs, & support for management.	
Nasaif, H. A. (2012) Kingdom of Bahrain To examine the knowledge and attitude of primary care physicians (PCPs) about the NP role prior to and following an educational intervention First study in Bahrain to evaluate PCP knowledge and attitudes prior to NP role implementation.	**Design:** quantitative Quasi-experimental **Sample:** Nonprobability convenience sample N=90 PCPs (27-63 yrs.), majority female, from 12 health centers. **Educational intervention:** two DVD used **Data Collection:** Survey (modified northern emergency nurse practitioner tool) used pre- and post- test **Data Analyses:** Descriptive. Significant difference pre & post- test Knowledge mean scores.	**Pre-test: knowledge of PCPs about NP role:** 85.3% had not read anything about NP, 46.7% had heard about NP 48.9 % strongly agreed, 10% disagreed that they understood the role of NP 46.7% strongly disagreed that they understood how the NP role will function. 41.1% strongly disagreed, 7.8% disagreed that they understood which patients are suitable for management by NP. 43.3% strongly disagreed that they understood the NP scope of practice. 38.9% strongly disagreed, 11.1% disagreed That they understood how the NP is different from an RN. 44.4% strongly	The majority of participants graduated and finished their training in local and regional universities where the NP role does not exist.	

		disagreed that they had a good understanding of how the NP clinical practice guideline will form the basis for the primary care nurse practitioner. 40% strongly disagree, 33.3% no opinion, 11,1% agreed, 7.8% strongly agreed that they understood the educational preparation required to become a primary care NP. 45.6% strongly disagree, 32.2% no opinion, 10% agreed, 6.7% strongly agreed that they understood the nursing board requirement for endorsement as an NP. **Pre-test: Attitudes of PCPs about the role of the NP** 52.5% agreed that the NP has the skill & knowledge to provide appropriate educational for specific patient groups, & to appropriately refer specific patient groups. 35.6% agreed, 31.1% no opinion, 21.1% strongly disagree, 8.9% disagreed that NP has the skill to prescribe medication. 37.8% had no opinion, 26.7% strongly disagree that the NP has the skill & knowledge to refer patient directly to outpatient specialist clinic. 36.6% agreed, 18.9% strongly disagree,28.9% no opinion that the NP's has the skill & knowledge to write absence-form work certificates. 33.3% had no opinion, 22.2% strongly disagree		

		that the NPs had the ability to discharge patients from health center. 42.2% agreed that the NP has the skill & knowledge to initiate medical diagnosis. 34.4% strongly disagree, 31.1% had no opinion that they had no skill and knowledge to refer a patient directly for admission as an in-patient. 51.1% agreed, 25.6% strongly agreed that the NP will make primary care more effective 54.4% agreed, 23.3% strongly agreed that the NP will improve access to primary care health services in the Kingdome of Bahrain		
Poghosyan, et al., 2017 USA To examine and compare the NP patient panel, job satisfaction, turnover intentions, & organizational structures within the employment settings of NPs with less than three (newly hired) versus those with more than three years of NP experience.	**Design:** quantitative Cross-sectional descriptive **Sample:** N= 342 NPs accessed the survey, 64 NPs not practicing in primary care and 278 NPs completed survey. (n= 98 new hired, 147 experienced) From adult, family, pediatric, women's health, and gerontology settings **Data Collection:** online survey **Data Analyses:** four- point Likert scale job satisfaction (intentions of leaving their job) and Organizational structure (i.e. relationship with	**Overall results:** 29% of both newly hires & experienced NPs reported job dissatisfied & 25.5% of new hires & 14.3% of experienced NPs planned to leave jobs (*p*=.03). **Group differences:** Role and organizational governance (only significant groups differences were reported in this table) A significantly greater new hires (42.9% vs 27.9% experienced NP disagreed that NP role is understood (*p=.02*) A significantly greater proportion of new hires 32.7% vs 21.1% of experienced NPs disagreed that staff members understood role (p=.05) A significantly greater proportion of new hires 22.4% vs 9.5% of	53.1% experienced NPs and 41.1% reported having their own patient panel Almost half of NPs reported that NPs are not represented in important committees with their organizations. 30% of newly hired and experienced NPs reported a lack of ancillary staff to prepare patients (e.g. height/ weight) during the visits. NPs in each group reported lacking adequate time during patient's visits. 38% of new hires vs 30.6% of experienced NPs reported not receiving feedback about their performance. 36.7% of new hires vs 26.5% of experienced NPs reported not being	

	physician and administrators, support, and the infrastructure for care delivery)	experienced NPs disagreed that patients understand the role (*p=.01*) **Relation with physicians:** Overall most of NP reported that physicians trusted their care decisions A significantly greater proportion of new hired (33.7%) vs (20.4%) of experienced NP disagreed that physicians may ask for advice (p=0.2) A significantly larger proportion of newly hired NPs (7.1%) vs (1.4%) of experienced NP disagreed with the statement that physicians trust NPs care decisions. **Relations with administration- no Significant group differences):** Majority of experienced and new hires disagree that administrators treat NP and physician equally. Large proportion of newly and experienced hired NPs are dissatisfied with their jobs	able to review outcome measures of their care. Both new hires & experienced NPs reported lack of NP involvement in organization governance. A significant challenge observed in the relationship between NPs and administrators. Administrators did not view NPs equal to other providers & did not share organizational resources equally between these providers.	
Hernandez & Anderson, 2011 USA To explore the NP experience caring for prehypertensive patients	**Design:** qualitative, Narrative inquiry **Sample:** Purposive, N= 8 NPs (5 males, 3 female) age 31-53 yrs. all Master prepared family NPs with 4 months and 18 years of practice experience. caring for prehypertensive patients in primary care.	3 themes emerged **1-<u>Realities of practice</u>** difficult transitions due to the fast-paced managed health care Lack of time (e.g. did not prioritize health promotion into patient's visit) **2-<u>Ambiguous role identity</u>** Disconnect between actual practice & model used in school (socialization nursing model)	**<u>Realities of practice</u>** Time constraints & financial considerations such as billing for healthcare services Lack of public support for health promotion activities. Daily pressure of tight schedules, double booking of patients, and coordinating care with ancillary healthcare services often led to a sense of just "surviving	

	Data Collection: Semi-structured Interviews (initial conducted face to face, follow up conducted by phone audio recorded) **Data Analyses:** Thematic analysis	Difficulty connecting medical & preventative care model **3-<u>Bridging medical and nursing models</u>** Patients' unwillingness to take health promotion seriously, lack of commitment NPs dealt with mounting feelings of helplessness.	the day" Lack of public support for health promotion activities	
Voogdt-Pruis et al. (2011) Netherlands To examine the experiences (barriers and facilitators) of general practitioners and practice nurses implementing nurse-delivered cardiovascular prevention in primary care	**Design:** qualitative study nested in a RCT. **Sample:** 1st interviews N= 6 practice nurses 2nd interviews 6 GPs & 6 general practice nurses (Nurses asked to write down their experiences and then to discuss in Focus groups) **Data Collection:** first focus group then semi-structured individual interviews (overlapping interview guide- 1 for GPs & one for nurses), **Data Analyses:** Context analyses	**Job description:** Nurses need additional training. Fear of losing some nursing tasks. **Guideline:** Lack of knowledge about guidelines for prevention of Cardiovascular Disease (CD). GPs commented that some of the nurses are not really trained on counselling. **Communication:** Lack of communication among GPs & nurses about practice nurses' performance. Insufficient coaching by doctors	**Job description:** GPs lack knowledge of the guideline, job description in shared care. **Guideline:** Shared decision making Equipment Lack of ability to register special circumstances or treatment. **Communication:** Did not know who to communicate with in the case of a patient visiting a specialist. **Context:** Limited patient recording & computer systems Clinic work hours Workload Poor patient recording	**Context:** Lack of physical space
Henni et al., 2018 Norway To describe the experiences of nurses with their new role as advanced geriatric nurses (AGN) in care for older adults and determine what strategies the nurses considered important in the development of their new role.	**Design:** Qualitative descriptive exploratory **Sample:** Sample N= 21 AGN All but one had experience in primary care & all had considerable experience as nurse before becoming as AGNs **Data Collection:** In depth interviews **Data Analyses:** Content analysis		Challenging to integrate & establish a new nurse role in the primary healthcare system Participants felt that it was difficult to develop role because there were no <u>formal regulations, framework or guidelines</u> Lack of engagement from the managers (e.g., Some AGNs felt that the managers had not performed enough to customize the AGN position in a way that optimized the use of knowledge and skills)	

			physicians & collogues were unfamiliar with the AGN role at first, this could lead to some conflicts with diminished as people worked together. The role of AGNs and other advanced practice nurses in Norway are currently unknown	
McKenna, et al., 2015 Australia To explore barriers & enablers influencing the development of advanced nursing roles in general practice from the perspective of key stakeholders in primary care.	**Design:** Qualitative exploratory (3 round Delphi study) **Sample:** N=23 (3 nursing academics, 5 decision makers in PHC, 6 professional organizations, 4 senior staff,4 leading practice nurses, I consumer advocate). **Data Collection:** semi structured interview guide (17 by phone and 5 face to face). **Data Analyses:** Thematic analysis		**<u>Increasing awareness and attractiveness of nursing in general practice:</u>** Limited attention to retention of nurses in primary care. Need for the development of a clear role definition. Finding sufficiently skilled nurses is a key factor in managing existing nursing workload. Difficulties in developing clear career pathway. **<u>Practice limitation:</u>** Nurses not encouraged to develop roles and work to their full scope of practice, many become frustrated and left their specialty. Lack of peer support and management support. Nurses feels frustrated being unable to influence care delivery models. Not having the time to undertake advanced care focused activities, (e.g. evaluation of care outcomes) Emphasis on business model rather than nursing service. **<u>Education and professional development factors:</u>** Lack of access (e.g. difficulty in finding replacement nurses) and funding to appropriate education (e.g. basic PD and post graduate education). Current education focused in	No designed work spaces due to lack of funding. Nurses frequently used treatment rooms or desk in corridors.

			clinical tasks. were more often around clinical tasks and not related to building towards advanced practice.	
Poghosyan & Aiken, 2015 USA To better understand NP roles and organizational characteristics important for NP practice in primary care settings	**Design:** Quantitative cross sectional **Sample:** Convenience sample of 314 NPs, from 2 northeastern states, response rate 40%. Practice setting: community health centers, doctors' office & hospital affiliated clinics. Age: mean 50.6 yrs. range 24 to 75 years. 94.1% female, 88.5% had Master's degree. **Data Collection:** 35 items survey (4-point scale). **Data Analyses:** *descriptive statistics*	**Job dissatisfaction** 13.8% very dissatisfied, only 39.9% very satisfied **Turnover** 14.8% planning to leave their job next year	**Job insecurity** 5.6% likely they will lose their jobs or be laid off in the next 12 months **Lack of clarity of NP role:** 1 in 4 NP indicated that their role is not well understood, NP working with more than 10 NPs (85%) were more likely to report that role was understood versus 73.8% of NPs who worked alone in their organization. **Lack of representation:** 60% reported that NPs are represented in important committees - disparities between the levels of support services provided in some organizations to NPs as compared to physicians. **Organizational relationships:** 49.5% of the NPs reported constant communication between NPs and administrators, 35.4% reported that administration shares information equally with NPs & physicians, 39.5% reported that the administration treats NPs and physicians equally. The highest percentage of NPs having their own patient panel was 61%.	
Poghosyan et al. (2018) USA Assessed the perspectives of physicians & NPs on the barriers & facilitators of implementing the NP Modernization Act 18 months	**Design:** Qualitative descriptive **Sample:** N=26 Purposive snowball (14 NP, mean age 41.3yrs, SD± 3.4 & 12 physicians, mean age 45.7yrs, SD ±2.7) **Data Collection** Semi- structured guide &	NP not well informed of the NP Modernization Act	*Stagnant organizational policy*: organizational bylaws not reformed because lack of leaders to encourage change. NP reported that practices sold to hospitals were less supportive of expanding NP scope of practice. *Lack of awareness of NP competencies:* some physicians & administrators not	

after the policy adaption.	individual interviews **Data Analyses:** Thematic analyses		familiar with the care NPs can deliver or their competencies. Physician perceived that NPs competencies are not generalizable to the overall NP workforce. *Lack of knowledge about the NP Modernization Act:* few physicians aware about Act. Both NPs & physicians reported that their organization do not keep informed about the state policy change. Physician autonomy and resistance to change: two physicians reported resistant to surrender some of their rights	