**Appendix A. Online Supplemental Material**

**Search Strategies by Database**

**PubMed via PubMed.gov/**

#1        "Pediatrics"[Mesh] OR "Hospitals, Pediatric"[Mesh] OR Pediatric[tw] OR pediatrics[tw] OR paediatric[tw] OR paediatrics[tw] OR “Infant"[Mesh] OR "Infant, Newborn"[Mesh] OR "Infant, Premature"[Mesh] OR "Child, Preschool"[Mesh] OR "Child"[Mesh] OR Infant[tw] OR infants[tw] OR newborn[tw] OR newborns[tw] OR premature[tw] OR preterm[tw] OR neonate[tw] OR neonatal[tw] OR toddler[tw] OR toddlers[tw] OR child[tw] OR children[tw] OR kid[tw] OR kids[tw] OR girl[tw] OR girls[tw] OR boy[tw] OR boys[tw]

#2        “blood gas”[tw] OR “blood gases”[tw] OR ((PetCO2[tw] OR PaCO2[tw] OR “carbon dioxide”[tw] OR PO2[tw] OR oxygen[tw] OR pH[tw] OR pHa[tw] OR “blood acid”[tw]) AND blood[tw]) OR "Blood"[Mesh] OR  "blood"[Subheading]

#3        Capillary[tw] OR capillaries[tw] OR “heel stick”[tw] OR “heel puncture”[tw] OR “skin puncture”[tw] OR percutaneous[tw] OR sinusoid[tw] OR sinusoidal[tw] OR sinusoids[tw] OR "Capillaries"[Mesh]

#4        Venous[tw] OR arterial[tw] OR intravascular[tw] OR intravascularly[tw] OR mixing[tw] OR techniques[tw] OR technique[tw] OR icing[tw] OR warming[tw] OR warm[tw] OR temperature[tw] OR analysis[tw] OR analyze[tw] OR analyzed[tw] OR contamination[tw] OR contaminate[tw] OR contaminated[tw] OR clot[tw] OR clots[tw] OR thrombosis[tw] OR thromboses[tw] OR thrombus[tw] OR air[tw] OR bubble[tw] OR dyshemoglobins[tw] OR dyshemoglobin[tw] OR indications[tw] OR contraindications[tw] OR squeeze[tw] OR squeezing[tw] OR squeezed[tw] OR time[tw] OR "site selection"[tw] OR preparation[tw] OR ((specimen[tw] OR blood[tw]) AND (handling[tw] OR handled[tw] OR handle[tw] OR handles[tw] OR collection[tw] OR collect[tw] OR collected[tw] OR collecting[tw])) OR phlebotomy[tw] OR phlebotomies[tw] OR "Blood Gas Analysis"[Mesh:NoExp] OR "Oximetry"[Mesh:NoExp] OR "Blood Specimen Collection"[Mesh:NoExp] OR "Phlebotomy"[Mesh:NoExp] OR "Specimen Handling"[Mesh:NoExp] OR "dyshemoglobins" [Supplementary Concept] OR  "Thrombosis"[Mesh:NoExp] OR complications[tw] OR complication[tw] OR burn[tw] OR burns[tw] OR bleeding[tw] OR bruising[tw] OR hematoma[tw] OR cellulitis[tw] OR osteomyletis[tw] OR pain[tw] OR “nerve damage”[tw] OR “side effect”[tw] OR “side effects”[tw] OR “adverse effect”[tw] OR “adverse effects”[tw] OR infection[tw] OR infections[tw] OR “Adverse effects”[Subheading] OR "Infection"[Mesh:NoExp] OR "Hematoma"[Mesh] OR Cost[tw] OR costs[tw] OR economic[tw] OR economics[tw] OR financial[tw] OR financing[tw] OR financed[tw] OR finance[tw] OR "Costs and Cost Analysis"[Mesh] OR price[tw] OR pricing[tw]

#5        #1 AND #2 AND #3 AND #4

#6        #5 NOT ("Animals"[Mesh] NOT "Humans"[Mesh])

#7        #6 NOT (Comment[sb] OR Editorial[ptyp] OR Interview[ptyp] OR Letter[ptyp] OR News[ptyp] OR Newspaper Article[ptyp] OR Review[ptyp] )

#8        #7 AND English[lang]

**CINAHL via EBSCOhost**

S1        TI(Pediatric OR pediatrics OR paediatric OR paediatrics OR Infant OR infants OR newborn OR newborns OR premature OR preterm OR neonate OR neonatal OR toddler OR toddlers OR child OR children OR kid OR kids OR girl OR girls OR boy OR boys) OR AB(Pediatric OR pediatrics OR paediatric OR paediatrics OR Infant OR infants OR newborn OR newborns OR premature OR preterm OR neonate OR neonatal OR toddler OR toddlers OR child OR children OR kid OR kids OR girl OR girls OR boy OR boys) OR MH "Pediatrics" OR MH "Hospitals, Pediatric" OR MH “Infant+" OR MH "Infant, Newborn+" OR MH "Infant, Premature" OR MH "Child, Preschool" OR MH "Child+"

S2        TI(“blood gas” OR “blood gases” OR ((PetCO2 OR PaCO2 OR “carbon dioxide” OR PO2 OR oxygen OR pH OR pHa OR “blood acid”) AND blood)) OR AB(“blood gas” OR “blood gases” OR ((PetCO2 OR PaCO2 OR “carbon dioxide” OR PO2 OR oxygen OR pH OR pHa OR “blood acid”) AND blood)) OR MH "Blood+"

S3        TI(Capillary OR capillaries OR “heel stick” OR “heel puncture” OR “skin puncture” OR percutaneous OR sinusoid OR sinusoidal OR sinusoids) OR AB(Capillary OR capillaries OR “heel stick” OR “heel puncture” OR “skin puncture” OR percutaneous OR sinusoid OR sinusoidal OR sinusoids) OR MH "Capillaries+"

S4        TI(Venous OR arterial OR intravascular OR intravascularly OR mixing OR techniques OR technique OR icing OR warming OR warm OR temperature OR analysis OR analyze OR analyzed OR contamination OR contaminate OR contaminated OR clot OR clots OR thrombosis OR thromboses OR thrombus OR air OR bubble OR dyshemoglobins OR dyshemoglobin OR indications OR contraindications OR squeeze OR squeezing OR squeezed OR time OR "site selection" OR preparation OR ((specimen OR blood) AND (handling OR handled OR handle OR handles OR collection OR collect OR collected OR collecting)) OR phlebotomy OR phlebotomies OR complications OR complication OR burn OR burns OR bleeding OR bruising OR hematoma OR cellulitis OR osteomyletis OR pain OR “nerve damage” OR “side effect” OR “side effects” OR “adverse effect” OR “adverse effects” OR infection OR infections OR Cost OR costs OR economic OR economics OR financial OR financing OR financed OR finance OR price OR pricing) OR AB(Venous OR arterial OR intravascular OR intravascularly OR mixing OR techniques OR technique OR icing OR warming OR warm OR temperature OR analysis OR analyze OR analyzed OR contamination OR contaminate OR contaminated OR clot OR clots OR thrombosis OR thromboses OR thrombus OR air OR bubble OR dyshemoglobins OR dyshemoglobin OR indications OR contraindications OR squeeze OR squeezing OR squeezed OR time OR "site selection" OR preparation OR ((specimen OR blood) AND (handling OR handled OR handle OR handles OR collection OR collect OR collected OR collecting)) OR phlebotomy OR phlebotomies OR complications OR complication OR burn OR burns OR bleeding OR bruising OR hematoma OR cellulitis OR osteomyletis OR pain OR “nerve damage” OR “side effect” OR “side effects” OR “adverse effect” OR “adverse effects” OR infection OR infections OR Cost OR costs OR economic OR economics OR financial OR financing OR financed OR finance OR price OR pricing) OR MH "Blood Gas Analysis" OR MH "Oximetry" OR MH "Blood Specimen Collection" OR MH "Phlebotomy" OR MH "Specimen Handling" OR MH "Thrombosis" OR MO “AE” OR MH "Infection" OR MH "Hematoma+" OR MH "Costs and Cost Analysis+"

S5        S1 AND S2 AND S3 AND S4

S6        S5 NOT (MH "Animals+" NOT MH "Human")

S7        S6 NOT PT (“Commentary” OR “Editorial” OR “Interview” OR “Letter” OR “Review”)

S8        S7 AND LA English

**Scopus via Scopus.com/**

#1        TITLE-ABS-KEY(Pediatric OR pediatrics OR paediatric OR paediatrics OR Infant OR infants OR newborn OR newborns OR premature OR preterm OR neonate OR neonatal OR toddler OR toddlers OR child OR children OR kid OR kids OR girl OR girls OR boy OR boys)

#2        TITLE-ABS-KEY(“blood gas” OR “blood gases” OR ((PetCO2 OR PaCO2 OR “carbon dioxide” OR PO2 OR oxygen OR pH OR pHa OR “blood acid”) AND blood))

#3        TITLE-ABS-KEY(Capillary OR capillaries OR “heel stick” OR “heel puncture” OR “skin puncture” OR percutaneous OR sinusoid OR sinusoidal OR sinusoids)

#4        TITLE-ABS-KEY(Venous OR arterial OR intravascular OR intravascularly OR mixing OR techniques OR technique OR icing OR warming OR warm OR temperature OR analysis OR analyze OR analyzed OR contamination OR contaminate OR contaminated OR clot OR clots OR thrombosis OR thromboses OR thrombus OR air OR bubble OR dyshemoglobins OR dyshemoglobin OR indications OR contraindications OR squeeze OR squeezing OR squeezed OR time OR "site selection" OR preparation OR ((specimen OR blood) AND (handling OR handled OR handle OR handles OR collection OR collect OR collected OR collecting)) OR phlebotomy OR phlebotomies OR complications OR complication OR burn OR burns OR bleeding OR bruising OR hematoma OR cellulitis OR osteomyletis OR pain OR “nerve damage” OR “side effect” OR “side effects” OR “adverse effect” OR “adverse effects” OR infection OR infections OR Cost OR costs OR economic OR economics OR financial OR financing OR financed OR finance OR price OR pricing)

#5        #1 AND #2 AND #3 AND #4

#6        #5 AND ( EXCLUDE ( DOCTYPE ,  "ed" )  OR  EXCLUDE ( DOCTYPE ,  "le" )  OR  EXCLUDE ( DOCTYPE ,  "re" ) )

#7        #6 AND ( LIMIT-TO ( LANGUAGE ,  "English" )