**Appendix** **B. Characteristics of Excluded Studies**

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| **Studies which only examined (or utilised) one fidelity level, therefore a comparison between levels of fidelity could not be made.** | **Total number of papers in this category = 23** |
| **Primary author & year** | **Title** |
| Alinier (2006) | Effectiveness of intermediate-fidelity simulation training technology in undergraduate nursing education. |
| Bingham (2015) | Retention of advanced cardiac life support knowledge and skills Following high-fidelity mannequin simulation training. |
| Bowyer (2010) | Teaching breaking bad news using mixed reality simulation. |
| Eun (2017) | Effects of simulation-based education combined team-based learning on self-directed learning, communication skills, nursing performance confidence and team efficacy in nursing students. |
| Everett-Thomas (2016) | The influence of high fidelity simulation on first responders retention of CPR knowledge. |
| Fransen (2012) | Effect of obstetric team training on team performance and medical technical skills: a randomised controlled trial. |
| Jarzemsky (2008) | Look before you leap: lessons learned when introducing clinical simulation. |
| Kunst (2017) | Using simulation to improve the capability of undergraduate nursing students in mental health care. |
| Loke (2014) | High fidelity full sized human patient simulation manikins: Effects on decision making skills of nursing students. |
| Mieure (2010) | A high-fidelity simulation mannequin to introducepharmacy students to advanced cardiovascular life support. |
| National Council of State Boards of Nursing (2009) | The effect of high-fidelity simulation on nursing students’ knowledge and performance: A pilot study. |
| Pinar (2016) | The effect of scenario-based simulation training technology on knowledge and skills of maternity nursing students in Turkey. |
| Radhakrishnan (2007) | Measuring clinical practice parameters with human patient simulation: A pilot study. |
| Re (2011) | The impact of human patient simulation on the attainment of learning outcomes. |
| Rochester (2012) | Providing simulation experiences for large cohorts of 1st year nursing students: Evaluating quality and impact. |
| Rubio-Gurung (2014) | In situ simulation training for neonatal resuscitation: An RCT. |
| Shepherd (2007) | Enhancing graduate nurses’ health assessment knowledgeand skills using low-fidelity adult human simulation. |
| Shin (2015a) | The effect of simulation courseware on critical thinking in undergraduate nursing students: Multi-site pre-post study. |
| Smith (2013) | An innovative approach to preparing nursing students for care of the elderly in the home. |
| Sportsman (2011) | Evaluating the impact of scenario-based high-fidelity patient simulation on academic metrics of student success. |
| Sword (2017) | A novel and cost-effective method for evaluating cardiopulmonary auscultation skills in student physical therapists. |
| Walker (2012) | PRONTO training for obstetric and neonatal emergencies in Mexico. |
| Yuan (2014) | Nursing students’ clinical judgment in high-fidelity simulation based learning: A quasi-experimental study. |

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| **Studies in which only subjective measures of satisfaction, and/or performance, with simulators of varying fidelities were presented, with no reporting of objective outcomes.** | **Total number of papers in this category = 9** |
| **Primary author & year** | **Title** |
| Andrighetti (2011) | Shoulder dystocia and postpartum hemorrhage simulations: student confidence in managing these complications. |
| Baptista (2016) | Satisfaction and gains perceived by nursing students with medium and high-fidelity simulation: A randomized controlled trial. |
| Basak (2016) | Beginning and advanced students’ perceptions of the use of low- and high-fidelity mannequins in nursing simulation. |
| Butler (2009) | Implementation of active learning pedagogy comparing low-fidelity simulation versus high-fidelity simulation in pediatric nursing education. |
| Fowler (2013) | High-fidelity manikin-based simulation: A study of implications for interprofessional healthcare practitioner education at the associate degree level of study. |
| Gore (2014) | Fidelity’s effect on student perceived preparedness for patient care. |
| Levett-Jones (2011b) | The development and psychometric testing of the satisfaction with simulation experience scale. |
| Miller (2010)  | Utilizing human patient simulators (HPS) to meet learning objectives across concurrent core nursing courses: A pilot study. |
| Tosterud (2013) | Nursing students’ perceptions of high- and low-fidelity simulation used as learning methods. |

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| **Studies in which participant groups were exposed to more than one simulator fidelity level, and therefore a comparison could not be made.** | **Total number of papers in this category = 8** |
| **Primary author & year** | **Title** |
| Ackermann (2009) | Investigation of learning outcomes for the acquisition and retention of CPR knowledge and skills learned with the use of high-fidelity simulation. |
| Akhu-Zaheya (2013) | Effectiveness of simulation on knowledge acquisition, knowledge retention, and self-efficacy of nursing students in Jordan. |
| Brydges (2010) | Comparing self-guided learning and educator-guided learning formats for simulation-based clinical training. |
| Donkers (2016) | High-fidelity simulation use in preparation of physician assistant students for neonatal and obstetric care. |
| Eng (2014) | High-fidelity simulation training in advanced resuscitation for pharmacy residents. |
| Hein (2010) | A training program for novice paramedics provides initial laryngeal mask airway insertion skill and improves skill retention at 6 months. |
| Skoy (2013) | Comparison of low- and higher-fidelity simulation to train and assess pharmacy students' injection technique. (*an attempt was made to contact the author in order to clarify study methodology and availability of data, however no reply was received).* |
| Vieck (2013) | The effects of moderate and high fidelity patient simulator use on critical thinking in associate degree nursing students. |

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| **Studies in which participants were medical professionals.** | **Total number of papers in this category = 5** |
| **Primary author & year** | **Title** |
| Campbell (2009) | High-fidelity simulation in neonatal resuscitation. |
| Curran (2015) | A randomized controlled study of manikin simulator fidelity on neonatal resuscitation program learning outcomes. |
| Finan (2012) | Improved procedural performance following a simulation training session may not be transferable to the clinical environment. |
| Lo (2011) | Comparison of traditional versus high-fidelity simulation in the retention of ACLS knowledge. |
| Nimbalkar (2015) | Randomized control trial of high fidelity vs low fidelity simulation for training undergraduate students in neonatal resuscitation. |

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| **Studies involving mixed health-care professional populations, but where non-medical professional data could not be extracted.** | **Total number of papers in this category = 6** |
| **Primary author & year** | **Title** |
| Adams (2015) | A comparison of teaching modalities and fidelity of simulation levels in teaching resuscitation scenarios. |
| Crofts (2008) | Patient-actor perception of care: a comparison of obstetric emergency training using manikins and patient-actors. |
| Hoadley (2009) | Learning advanced cardiac life support: A comparison study of the effects of low and high-fidelity Simulation. |
| Meurling (2014) | Comparison of high- and low equipment fidelity during paediatric simulation team training: a case control study. |
| Monod (2014) | Optimization of competency in obstetrical emergencies: a rolefor simulation training. |
| Settles (2011) | Advanced cardiac life support instruction: Do we know tomorrow what we know today? |

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| **Comparison group involves virtual reality simulation** | **Total number of papers in this category = 6** |
| **Primary author & year** | **Title** |
| Ahlqvist (2013) | A randomized controlled trial on 2 simulation-based training methods in radiology: effects on radiologic technology student skill in assessing image quality. |
| Davoudi (2010) | Comparative effectiveness of low- and high-fidelity bronchoscopy simulation for training in conventional transbronchial needle aspiration and user preferences. |
| LeFlore (2012) | Can a virtual patient trainer teach student nurses how to save lives-teaching nursing students about pediatric respiratory diseases. |
| Reinhardt (2012)  | IV insertion simulation: confidence, skill, and performance. |
| Roh (2013)  | The effects of simulation-based resuscitation training on nurses' self-efficacy and satisfaction. |
| Wang (2013) | Comparison of two simulation methods on Chinese BSN students’ learning. |

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| **Compares mannequin based simulation to paper-simulation exercises.** | **Total number of papers in this category = 3** |
| **Primary author & year** | **Title** |
| Bowling (2016) | Effect of simulation on knowledge, self-confidence, and skill performance in the USA: A quasi-experimental study. |
| Thompson (2012) | Clinical simulation fidelity and nurses’ identification of critical event risk: a signal detection analysis. |
| Yang (2012) | Effect of improving the realism of simulated clinical judgement tasks on nurses’ overconfidence and underconfidence: Evidence from a comparative confidence calibration analysis. |

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| **Compares use of CD or computer generated sounds to a mannequin.** | **Total number of papers in this category = 2** |
| **Primary author & year** | **Title** |
| Chen (2015) | Evaluating the impact of high- and low-fidelity instruction in the development of auscultation skills. |
| de Giovanni (2009) | Relative effectiveness of high- versus low-fidelity simulation in learning heart sounds. |

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| **Reviews / editorials / articles where no primary data is presented.** | **Total number of papers in this category = 5** |
| **Primary author & year** | **Title** |
| Biteman (2011) | Use of patient simulation to improve home health nurses’ skills, clinical judgment, and competency. |
| Brazil (2008) | Performance assessment and simulation fidelity for dummies. |
| Cunningham (2010) | Incorporating medium fidelity simulation in a practical nurse education program. |
| Laschinger (2008) | Effectiveness of simulation on health profession students'knowledge, skills, confidence and satisfaction. |
| Richardson (2014) | High-fidelity simulation in nursing education: A change in clinical practice. |

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| **Miscellaneous (individual reasons provided under title)** | **Total number of papers in this category = 7** |
| **Primary author & year** | **Title** |
| Brady (2015) | The effectiveness of varied levels of simulation fidelity on integrated performance of technical skills in midwifery students - A randomised intervention trial. |
| 3 groups: all groups used the same part-task trainer; one group also had a poster added, and one a standardised patient. |
| Fero (2010) | Critical thinking skills in nursing students: comparison of simulation-based performance with metrics. |
| Study compared training with a high-fidelity mannequin vs that provided by video-taped vignettes of actors. |
| Hochmitz (2011) | Physical fidelity versus cognitive fidelity training in procedural skills acquisition. |
| Involves technology students rather than healthcare students. |
| Karadag (2012) | The effect of simulation training on the learning of some psychomotor skills by first year nursing students: the case of Turkey. |
| Compares high-fidelity mannequin with practice on classmates. |
| Lantier (1992) | An experimental assessment of varied fidelity in instructional simulation on the facilitation of immediate and delayed performance of intravenous calculation and regulation. |
| Thesis: unobtainable. |
| Mills (2015) | Effects of low- versus high-fidelity simulations on the cognitive burden and performance of entry-level paramedicine students. |
| Compares outcomes with exposure to different environmental rather than mannequin fidelities. |
| Sawyer (2016) | Neonatal airway simulators, how good are they? A comparative study of physical and functional fidelity. |
| An evaluation of different simulator fidelities rather than an assessment of simulator influence on learning outcomes. |

Note: A number of the studies in the table above may have met more than one exclusion criterion (or not met all inclusion criteria), but for simplicity only one primary reason has been listed for each study.