

Supplementary Table S16. Cardiology: National Consensus Catalogue of Essential Psychomotor Competencies for Graduating Medical Students

Psychomotor competencies
Master the technique of hand hygiene using alcohol-based hand rub and soap and water
Master the technique of a comprehensive cardiac physical examination
Perform independently the technique of acquiring a standard 12-lead surface electrocardiogram, including electrode placement and operation of the electrocardiograph
Perform independently the technique of blood pressure measurement with a sphygmomanometer in the upper limbs in adults
Perform independently the technique of ventilation using a barrier device
Perform independently the technique of chest compressions during cardiopulmonary arrest
Perform independently the technique of operating an automated external defibrillator
Perform independently the technique of manual cardiac defibrillation using adhesive electrodes
Perform independently the technique of manual cardiac defibrillation using handheld paddles
Perform independently the technique of synchronized electrical cardioversion
Perform under supervision the technique of endotracheal intubation in adults
Perform under supervision the technique of standardized acquisition of basic point-of-care ultrasound (POCUS) views
Perform independently the technique of radial artery puncture for arterial blood gas sampling
Perform independently the technique of peripheral venous puncture with catheter insertion in adults
Perform under supervision the technique of intraosseous access in adults
Perform independently the technique of internal jugular vein puncture for central venous access
Perform independently the technique of subclavian vein puncture for central venous access
Perform under supervision the technique of transcutaneous cardiac pacing

Supplementary Table S17. Dermatology: National Consensus Catalogue of Essential Psychomotor Competencies for Graduating Medical Students

Psychomotor competencies
Master the technique of surgical hand and forearm antisepsis extending to the elbows
Perform independently the technique of assembly of the sterile surgical instrument table
Perform independently the technique of patient skin antisepsis for surgical procedures
Perform independently the technique of systematic physical examination of the skin using inspection and palpation
Perform independently the technique of systematic physical examination of the scalp using inspection and palpation
Perform independently the technique of systematic physical examination of the nails using inspection and palpation
Perform independently the technique of systematic physical examination of the visible mucous membranes using inspection
Perform under supervision the technique of dermoscopic examination of skin lesions
Perform independently the technique of physical examination of tactile sensation
Perform independently the technique of physical examination of pain sensation
Perform independently the technique of physical examination of thermal sensation
Perform independently the technique of application of a simple dressing to nonsurgical skin lesions not resulting from burns
Perform independently the technique of manual surgical knot tying
Perform independently the technique of suturing wounds involving the skin and subcutaneous tissue
Perform independently the technique of removal of skin sutures
Perform independently the technique of standardized measurement of cutaneous lesions using an appropriate measuring instrument
Perform under supervision the technique of collection of a cutaneous specimen for direct mycological examination

Supplementary Table S18. Gastroenterology: National Consensus Catalogue of Essential Psychomotor Competencies for Graduating Medical Students

Psychomotor competencies
Master the technique of hand hygiene using alcohol-based hand rub and soap and water
Master the technique of comprehensive abdominal physical examination
Perform independently the technique of abdominal circumference measurement
Perform independently the technique of physical examination of the oral cavity and oropharynx
Perform independently the technique of external inspection and palpation of the perianal and anal region
Perform independently the technique of digital rectal examination of the anal canal and rectum
Perform independently the technique of the water swallow test
Perform independently the technique of nasogastric tube insertion in adults
Perform independently the technique of nasoenteric tube insertion in adults
Perform independently the technique of orogastric tube insertion in adults
Perform independently the technique of diagnostic paracentesis
Perform under supervision the technique of therapeutic paracentesis
Perform under supervision the technique of gastric lavage
Perform under supervision the technique of Sengstaken-Blakemore tube insertion in adults

Supplementary Table S19. Gynecology and Obstetrics: National Consensus Catalogue of Essential Psychomotor Competencies for Graduating Medical Students

Psychomotor competencies
Master the technique of surgical hand and forearm antisepsis extending to the elbows
Perform independently the technique a of comprehensive general physical examination of the pregnant woman
Perform independently the technique of surgical gowning and gloving
Perform independently the technique of surgical gown and glove removal
Perform independently the technique of physical examination of the female external genitalia
Perform under supervision the technique of vaginal speculum examination
Perform independently the technique of bimanual gynecologic examination using vaginal examination combined with abdominal palpation
Perform independently the technique of collection of cervicovaginal specimens for cytology
Perform independently the technique of collection of vaginal secretions
Perform independently the technique of indwelling urinary catheter insertion in adults
Perform independently the technique of intermittent urinary catheter insertion in adults
Perform independently the technique of measurement of uterine fundal height
Perform independently the technique of obstetric abdominal physical examination of the pregnant woman
Perform independently the technique of fetal heart auscultation
Perform independently the technique of blood pressure measurement in pregnant women using appropriate positioning and cuff size
Perform independently the technique of positioning the pregnant woman in the left lateral decubitus position to reduce aortocaval compression
Perform independently the technique of perineal protection during cephalic vaginal delivery
Perform independently the technique of assisting with delivery of the fetal head during cephalic vaginal delivery
Perform independently the technique of assisting with delivery of the fetal shoulders during cephalic vaginal delivery
Perform independently the technique of assisting with physiologic placental delivery
Perform independently the technique of inspection of the birth canal after vaginal delivery
Perform independently the technique of inspection of the placenta and fetal membranes
Perform under supervision the technique of bimanual uterine compression
Perform independently the technique of physical examination of the postpartum woman during the immediate postpartum period
Perform independently the technique of demonstration of manual breast milk expression
Perform independently the technique of demonstration maternal–infant positioning and correct latch during breastfeeding
Perform independently the technique of placement and removal of cardiotocography equipment
Perform independently the technique of physical examination of the breasts

Supplementary Table S20. Adult Intensive Care Medicine: National Consensus Catalogue of Essential Psychomotor Competencies for Graduating Medical Students

Psychomotor competencies
Master the technique of surgical hand and forearm antisepsis extending to the elbows
Perform independently the technique of a systematic physical examination of the critically ill patient
Perform independently the technique of applying a standardized scale for assessment of the level of sedation
Perform independently the technique of applying a standardized scale for clinical assessment of pain
Perform under supervision the technique of a standardized neurological examination of brainstem functions
Perform independently the technique of blood pressure measurement with a sphygmomanometer in the upper limbs in adults
Perform independently the technique of blood pressure measurement with a sphygmomanometer in the lower limbs in adults
Perform independently the technique of peripheral oxygen saturation monitoring by pulse oximetry
Perform independently the technique of cardiac monitoring
Perform independently the technique of bag-valve-mask ventilation in adults
Perform under supervision the technique of supraglottic airway device insertion in adults
Perform under supervision the technique of direct laryngoscopy and endotracheal intubation in adults
Perform under supervision the technique of endotracheal intubation using videolaryngoscopy in adults
Perform independently the technique of peripheral venous puncture with catheter insertion in adults
Perform independently the technique of radial artery puncture for arterial blood gas sampling in adults
Perform under supervision the technique of radial artery catheterization for invasive monitoring
Perform under supervision the technique of internal jugular venous puncture for central venous access in adults
Perform under supervision the technique of subclavian venous puncture for central venous access in adults
Perform under supervision the technique of point-of-care ultrasound (POCUS) image acquisition to assist vascular puncture
Perform under supervision the technique of surgical cricothyrotomy
Perform under supervision the technique of needle cricothyrotomy
Perform independently the technique of assembly and functional testing of the mechanical ventilator circuit
Perform under supervision the technique of initial adjustment of ventilator parameters in conventional mechanical ventilation modes
Perform independently the technique of connecting the mechanical ventilator to the patient and initiating mechanical ventilation
Perform independently the technique of capnography monitoring
Master the technique of chest compressions during cardiopulmonary arrest
Perform independently the technique of manual cardiac defibrillation using adhesive electrodes in adults
Perform independently the technique of manual cardiac defibrillation using handheld paddles in adults
Perform under supervision the technique of synchronized electrical cardioversion in adults
Perform under supervision the technique of standardized acquisition of basic point-of-care ultrasound (POCUS) views

Note: For the purposes of this catalogue, POCUS competence refers exclusively to the supervised acquisition of basic ultrasound views and recognition of elementary findings previously defined for undergraduate medical education. It does not include comprehensive ultrasound examinations, formal reporting, or specialized diagnostic interpretation.

Supplementary Table S21. Neurology: National Consensus Catalogue of Essential Psychomotor Competencies for Graduating Medical Students

Psychomotor competencies
Master the technique of hand hygiene using alcohol-based hand rub and soap and water
Master the technique of a comprehensive general physical examination
Perform independently the technique of physical examination of the twelve cranial nerves
Perform independently the technique of physical examination of light touch sensation
Perform independently the technique of physical examination of pain sensation
Perform independently the technique of physical examination of temperature sensation
Perform independently the technique of physical examination of vibration sensation
Perform independently the technique of physical examination of proprioception
Perform independently the technique of physical examination of discriminative sensation
Perform independently the technique of assessment of cerebellar coordination using standardized tests and maneuvers
Perform independently the technique of gait examination
Perform independently the technique of static balance examination
Perform independently the technique of physical examination of muscle bulk
Perform independently the technique of physical examination of muscle tone
Perform independently the technique of physical examination of muscle strength
Perform independently the technique of examination of deep tendon reflexes
Perform independently the technique of physical examination of superficial reflexes
Perform independently the technique of examination of signs of meningeal irritation (Kernig sign, Brudzinski sign, and nuchal rigidity)
Perform independently the technique of assessment of the level of consciousness using standardized evaluation of eye, verbal, and motor responses
Perform independently the technique of safe physical restraint of the patient
Perform under supervision the technique of intracranial pressure measurement using an external ventricular drain
Perform under supervision the technique of lumbar puncture for cerebrospinal fluid collection
Perform independently the technique of direct ophthalmoscopy
Perform independently the technique of physical examination of abnormal movements (tremor, myoclonus, dystonia, chorea, and fasciculations)
Perform under supervision the technique of standardized neurological examination of brainstem functions

Supplementary Table S22. Ophthalmology: National Consensus Catalogue of Essential Psychomotor Competencies for Graduating Medical Students

Psychomotor competencies
Master the technique of surgical hand and forearm antisepsis extending to the elbows
Perform independently the technique of surgical gowning and gloving
Perform independently the technique of surgical gown and glove removal
Perform independently the technique of assembly of the sterile surgical instrument table
Perform independently the technique of patient skin antisepsis for surgical procedures
Perform independently the technique of distance and near visual acuity assessment
Perform independently the technique of confrontation visual field testing
Perform independently the technique of inspection of the eyelids, conjunctiva, sclera, and cornea using direct illumination
Perform under supervision the technique of corneal sensitivity assessment
Perform independently the technique of pupillary examination
Perform independently the technique of the red reflex test
Perform under supervision the technique of oblique illumination of the anterior segment
Perform independently the technique of direct ophthalmoscopy
Perform independently the technique of the Hirschberg test for assessment of ocular alignment
Perform independently the technique of physical examination of extraocular motility
Perform under supervision the technique of assessment of ocular tension by digital palpation
Perform under supervision the technique of removal of a superficial foreign body from the conjunctiva or eyelid
Perform independently the technique of occlusive eye dressing application
Perform independently the technique of ocular irrigation with normal saline
Perform independently the technique of eye drop instillation
Perform independently the technique of ophthalmic ointment application
Perform under supervision the technique of simple suturing of eyelid wounds
Perform under supervision the technique of contact lens removal
Perform independently the technique of guiding individuals with low vision or blindness using the human guide technique
Perform independently the technique of upper eyelid eversion

Supplementary Table S23. Orthopedics and Traumatology: National Consensus Catalogue of Essential Psychomotor Competencies for Graduating Medical Students

Psychomotor competencies
Master the technique of surgical hand and forearm antisepsis extending to the elbows
Perform independently the technique of surgical gowning and gloving
Perform independently the technique of surgical gown and glove removal
Perform independently the technique of assembly of the sterile surgical instrument table
Perform independently the technique of patient skin antisepsis for surgical procedures
Perform independently the technique of temporary immobilization of limb fractures using splints and braces
Perform independently the technique of physical examination of the pelvis in the trauma setting
Perform independently the technique of sterile coverage and initial immobilization of open fractures
Perform under supervision the technique of closed reduction of peripheral limb dislocations
Perform independently the technique of assessment of compartment tension, pain on passive movement, and neurovascular function of the limb
Perform independently the technique of initial cleaning and coverage of traumatic limb wounds without bone exposure
Perform under supervision the technique of preservation of amputated segments for transport and possible replantation
Perform independently the technique of suturing wounds involving the skin and subcutaneous tissue
Perform independently the technique of incision and drainage of a cutaneous abscess
Perform under supervision the technique of fitting and application of prefabricated limb orthoses
Perform under supervision the technique of fitting and use of assistive walking devices
Perform under supervision the technique of assessment of hip instability in the newborn
Perform under supervision the technique of reduction of a dislocated hip in the newborn
Perform independently the technique of physical examination of the newborn musculoskeletal system
Perform independently the technique of gait examination
Perform independently the technique of static balance examination
Perform independently the technique of neurovascular physical examination of the limb
Perform independently the technique of physical examination of the spine
Perform independently the technique of physical examination of the shoulder joint
Perform independently the technique of physical examination of the elbow joint
Perform independently the technique of physical examination of the wrist and hand
Perform independently the technique of physical examination of the knee joint

Supplementary Table S24. Otorhinolaryngology: National Consensus Catalogue of Essential Psychomotor Competencies for Graduating Medical Students

Psychomotor competencies
Master the technique of surgical hand and forearm antisepsis extending to the elbows
Perform independently the technique of surgical gowning and gloving
Perform independently the technique of surgical gown and glove removal
Perform independently the technique of assembly of the sterile surgical instrument table
Perform independently the technique of patient skin antisepsis for surgical procedures
Perform independently the technique of physical examination of the oral cavity and oropharynx
Perform independently the technique of physical examination of the ear by external inspection
Perform independently the technique of otoscopy
Perform independently the technique of external inspection of the nose
Perform independently the technique of anterior rhinoscopy
Perform independently the technique of systematic inspection and palpation of the cervical region
Perform under supervision the technique of examination of laryngeal mobility
Perform independently the technique of the Valsalva maneuver
Perform independently the technique of anterior nasal packing
Perform under supervision the technique of posterior nasal packing
Perform under supervision the technique of vestibular repositioning using standardized maneuvers
Perform independently the technique of removal of a visible, non-impacted anterior nasal foreign body
Perform independently the technique of removal of a visible, non-impacted foreign body from the external auditory canal
Perform independently the technique of the Weber test
Perform independently the technique of the Rinne test
Perform independently the technique of examination of nystagmus
Perform independently the technique of the head impulse test

Supplementary Table S25. Pediatrics: National Consensus Catalogue of Essential Psychomotor Competencies for Graduating Medical Students

Psychomotor competencies
Master the technique of hand hygiene using alcohol-based hand rub and soap and water
Master the technique of comprehensive and systematic physical examination of the pediatric patient
Perform independently the technique of weight measurement in newborns, infants, children, and adolescents
Perform independently the technique of length measurement in newborns and infants and height measurement in children and adolescents
Perform independently the technique of head circumference measurement in newborns, infants, and children
Perform under supervision the technique of standardized assessment of newborn vitality in the delivery room
Perform independently the technique of newborn positioning to maintain airway patency
Perform independently the technique of drying and warming the newborn
Perform independently the technique of bag-valve-mask ventilation in infants, children, and adolescents
Perform under supervision the technique of bag-valve-mask ventilation in newborns
Master the technique of chest compressions during cardiopulmonary arrest in pediatric patients
Perform independently the technique of safe newborn positioning for skin-to-skin contact with the mother
Perform independently the technique of umbilical cord clamping and cutting
Perform under supervision the technique of suctioning the newborn upper airway when obstruction to breathing or ventilation is present
Perform independently the technique of demonstrating maternal-infant positioning and correct latch during breastfeeding
Perform independently the technique of nasal cannula placement for oxygen delivery in pediatric patients
Perform independently the technique of fitting face masks for oxygen delivery in pediatric patients, including a simple face mask and a non-rebreather mask with reservoir
Perform independently the technique of assessing responsiveness and breathing in pediatric patients
Perform independently the technique of palpating a central arterial pulse in pediatric patients
Perform independently the technique of positioning unresponsive infants and children with spontaneous breathing in the recovery position
Perform independently the technique of manual airway opening in pediatric patients
Perform independently the technique of suctioning the upper airway in infants, children, and adolescents
Perform independently the technique of relief of foreign-body airway obstruction in responsive newborns and infants
Perform independently the technique of relief of foreign-body airway obstruction in responsive children and adolescents
Perform independently the technique of ventilation using a barrier device
Perform independently the technique of oropharyngeal airway insertion in infants, children, and adolescents
Perform under supervision the technique of endotracheal intubation using direct laryngoscopy in infants
Perform under supervision the technique of endotracheal intubation using direct laryngoscopy in children and adolescents
Perform under supervision the technique of capnography monitoring
Perform independently the technique of using an automated external defibrillator (AED) in pediatric patients
Perform under supervision the technique of supraglottic airway device insertion in pediatric patients
Perform independently the technique of peripheral venipuncture with catheter insertion in pediatric patients
Perform under supervision the technique of intraosseous access in pediatric patients
Perform under supervision the technique of manual cardiac defibrillation in pediatric patients
Perform under supervision the technique of synchronized electrical cardioversion in pediatric patients
Perform under supervision the technique of transcutaneous cardiac pacing
Perform independently the technique of local anesthetic infiltration into the skin and subcutaneous tissue
Perform independently the technique of irrigation and cleansing of superficial skin wounds not resulting from burns or limb trauma
Perform independently the technique of simple dressing of nonsurgical skin lesions not resulting from burns
Perform independently the technique of incision and drainage of a cutaneous abscess
Perform independently the technique of suturing wounds involving the skin and subcutaneous tissue

It continues...

Supplementary Table S25. Continuation.

Psychomotor competencies
Perform independently the technique of demonstrating the use of inhalation devices
Perform independently the technique of nasoenteral tube insertion in infants, children, and adolescents
Perform under supervision the technique of nasoenteral tube insertion in newborns
Perform independently the technique of nasogastric tube insertion in infants, children, and adolescents
Perform under supervision the technique of nasogastric tube insertion in newborns
Perform independently the technique of urinary catheter insertion in infants, children, and adolescents
Perform independently the technique of radial artery puncture for arterial blood gas sampling in children and adolescents
Perform under supervision the technique of thoracentesis in children and adolescents
Perform independently the technique of peripheral oxygen saturation monitoring by pulse oximetry
Perform independently the technique of blood pressure measurement in pediatric patients
Perform independently the technique of physical examination of the fontanelles

Note: For the purposes of this catalogue of psychomotor skills, pediatric age groups were standardized as follows: newborn, from birth through 28 days of life; infant, from 29 days through 12 months; child, from 1 through 9 years; and adolescent, from 10 through 19 years. These definitions were used consistently in the descriptions of psychomotor skills, according to the age group to which each procedure applies.

Source: World Health Organization (WHO). Minimum technical standards and recommendations for reproductive, maternal, newborn and child health care. WHO; 2022.

Supplementary Table S26. Pulmonology: National Consensus Catalogue of Essential Psychomotor Competencies for Graduating Medical Students

Psychomotor competencies
Master the technique of hand hygiene using alcohol-based hand rub and soap and water
Master the technique of a comprehensive general physical examination
Master the technique of a comprehensive physical examination of the respiratory system
Perform independently the technique of using inhalation devices
Perform independently the technique of peak expiratory flow measurement using an appropriate meter
Perform independently the technique of application of facial masks for oxygen delivery in adults, including a simple face mask and a non-rebreather mask with reservoir
Perform independently the technique of bag-valve-mask ventilation in adults
Perform independently the technique of nasal cannula application for oxygen delivery in adults
Perform under supervision the technique of initial adjustment of ventilator parameters in conventional mechanical ventilation modes
Perform independently the technique of assembly and functional testing of the mechanical ventilator circuit
Perform under supervision the technique of needle cricothyrotomy
Perform under supervision the technique of surgical cricothyrotomy
Perform under supervision the technique of tube thoracostomy in adults
Perform independently the technique of tracheostomy tube replacement
Perform under supervision the technique of therapeutic thoracentesis in adults
Perform under supervision the technique of diagnostic thoracentesis in adults
Perform independently the technique of tuberculin skin test administration using purified protein derivative
Perform independently the technique of radial artery puncture for arterial blood gas sampling in adults
Perform independently the technique of suctioning of upper airway secretions in adults

