Vaginal Hysterectomy:
- **Simulator:**
  - The simulator used must have the ability to simulate a Vaginal Hysterectomy procedure. Some available options include:
    - Low fidelity constructed vaginal hysterectomy model
    - Miya Model
- **Staff/Instructor roles:**
  - Staff to play role of assistant surgeon
- **Additional equipment:**
  - Surgical instruments, suture, headlamp or other portable lighting
- **Simulation Instructions:**
  - Utilize the simulation curriculum for the scenarios
  - Allow the team to use the Vaginal Hysterectomy Checklist
  - Sample forms for evaluation
- **Debriefing:**
  - Use the provided checklist/evaluation forms to guide the group through the debrief and review performance
  - Allow all members of the group to practice and demonstrate the vaginal hysterectomy procedure on the simulator
- **Evaluation:**
  - The participant will be evaluated with the provided evaluation form
  - If the instructor feels that critical errors were made, then the procedure may be conducted again
  - If there are specific elements of the procedure that the instructor feels the participant needs to practice, this can also be done
Construction and set-up of Low Fidelity Vaginal Hysterectomy Model

1.0 Example Case Scenarios

TVH: CLINICAL SCENARIO - 1

A 48 yo G3P3013 presents with complaints of painful and heavy menses for the last year. She has not had any relief with the birth control pill, Mirena IUD, or prior endometrial ablation. She has had 3 vaginal deliveries, no significant past medical or surgical history. Upon examination, she has unremarkable vital signs and her pelvic exam reveals a 10 week mobile, non-tender uterus with moderate descensus (cervix comes ½ way down the vagina). Hematocrit is 31. Endometrial biopsy shows proliferative endometrium and pelvic ultrasound shows an 8 cm uterus with a 2 cm fundal intramural fibroid and no adnexal abnormalities. You review the results with the patient and counsel her on her management options.

TVH: CLINICAL SCENARIO – 2

A 39 yo G2P2 presents with prolonged and heavy periods since the delivery of her child 4 years ago. She has hypertension so cannot take combination birth control pills. She had significant weight gain and irregular bleeding on DepoProvera. She refuses Mirena IUD because it is a foreign body. Her history is otherwise notable for obesity (BMI 32), 2 prior vaginal deliveries, and tubal ligation. Upon exam, her vital signs are unremarkable and her pelvic exam reveals a normal sized, mobile, non-tender uterus with mild descensus (cervix comes 1/3 way down the vagina). Hematocrit is 30. Endometrial biopsy shows proliferative endometrium and pelvic ultrasound shows 6 cm uterus, 1 cm endometrial stripe, and normal adnexa. You review the results with the patient and counsel her on her management options. She states that she wants definitive management.
2.0 Pre-Simulation Briefing/ Orientation

- Do a thorough orientation of the room, equipment and simulators. This should take no more than 5 – 10 min.
- Alternatively, if you want to have the learners build the simulator, this will take 20 – 30 min.
- Set the stage for the simulation by doing the following:
  - Discuss the learning objectives for the day.
  - Have the learners practice patient counseling by counseling you about the procedures.
  - Explain that everything should either be verbalized or done as if this was an actual operating room setting.
3.0 Vaginal Hysterectomy Simulation Setup

Objective:
Creating a Hysterectomy Model for simulation of performing a vaginal hysterectomy (TVH) to achieve the following educational objectives and surgical skills:
1. Identification of anatomical structures
2. Knowledge of steps in TVH including entry into the anterior/posterior cul-de-sac
3. Flow of operation and assessment of forward planning, time and motion
4. Knowledge and use of instruments
5. Use of assistants
7. Knot tying/ligation

Simulator:
- The TVH bony pelvis (flower pot base) can also be used for the TAH simulator.
- Both simulators are initially assembled in the same manner. The inserts and pelvic floor are slightly different for TAH vs TVH.
- The TVH model can be modified to change the complexity of the surgical procedure. (e.g. uterine prolapse or enlarged uterus).

Assembly time: < 1 hr but significantly shorter if multiple simulators made at the same time.
4.0 Basic Scenario Tips

Answer to common questions that come up:

- The purpose of this simulator is to familiarize the learners with the common steps of a vaginal hysterectomy.
- Remember that this is a simulation, nothing can be as exact as real-life.
- Reiterate what is important as the learners goes through the steps of the procedures from start to finish so that they are more familiar with the steps when they actually do these procedures in the operating room.

Common Pitfalls to monitor for:

- Make your vagina, vessels, and ligaments long enough to allow for descensus during TVH procedure
- Do not put too much cotton material when using the Press and Seal as it can prevent proper adherence
- Make sure that the Press and Seal is adhering at least 1/2 way down the vagina (stretchy fabric) to allow simulation of entering the anterior and posterior cul-de-sac.
5.0 Case Flow/Algorithm and Completion Criteria

**PART 1 Patient Set Up**
1. Consent the patient properly for the procedure (counsel patient on risks, benefits indications and alternatives to the procedure)
2. Conduct time out: patient identity (name and DOB), allergies, blood available, etc
3. Administer appropriate antibiotics
4. Administer appropriate DVT Prophylaxis
5. Describe the positioning of the patient
   a. dorsal lithotomy using Candy Cane or Allen Stirrups
   b. supine position
6. Describe or perform exam under anesthesia
7. Describe/assess uterine descent
8. Describe anatomic abnormalities such as cystocele/rectocele/uterine prolapse
9. Describe vaginal and abdominal prep and Foley catheter placement

**Part 2 Instrument Set Up**
1. Identify and call for instruments
2. Describe connection of energy sources and suction
3. Perform safety checklist
4. Demonstrate appropriate placement of Clamps
5. Demonstrate appropriate use of retractors

**Part 3 TVH Procedure**
1. Describe placement of the patient in Trendelenburg
2. Visually inspect and describe anatomic defects
3. Identify and describe key surgical anatomy
4. Appropriately demonstrate uterine descent
5. Make initial incision with sharp blade in correct place

6. Bladder is dissected off the anterior cervix: Metzenbaum scissors are used to develop a plane between the bladder and the anterior cervix.

7. Appropriately enter anterior and posterior peritoneum

8. Identify uterosacral and cardinal ligaments

9. Identify uterine vessels

10. Correctly clamp, cut, and ligate all ligaments and vessels using appropriate large clamp (e.g., Heaney clamp) and 0 delay absorbable suture

11. Removes uterus ONLY when all ligaments and vessels are ligated and secured

12. Clamp upper pedicles with appropriate large clamp (e.g., Heaney)

13. Doubly ligate upper pedicles using 0 delay absorbable suture

14. Describes hemostasis by evaluating pedicles in a systematic fashion

15. Perform closure of vaginal cuff using figure-of-eight sutures

16. Describe reversing the patient from Trendelenburg
6.0 Post-Simulation Actions:

1. You may utilize the vaginal hysterectomy checklist (See Section 7.0)
2. Review with the learner their performance
MATERIALS (cost approximately $20)
Most of the materials can be reused
Most of the materials can be substituted for similar products and are easily found

Pelvis (Figure 1)

Bony pelvis: 1 plastic flower pot (11 in high x 13 in wide): soft enough to cut with garden shears or utility knife (flower pot pelvis is fully reusable)
   (can order this flower pot on-line: GreenhouseMegastore.com)
2 to 4 three-quarter inch long flat head #8 wood screws and metal washers
1-2 pieces of particle board/plywood (½ in thick, 8 x 16 in)
10 pieces (2.5 – 3 in length) garden wires
Vulva/perineum (see also Figure 2.11): Felt fabric (8 x 8 in)
Awl – to place holes in the flowerpot
Screwdriver – to screw flower pot to wooden board(s)
Spray adhesive glue – to adhere felt to flower pot
Inexpensive pink fabric to line the flower pot as parietal peritoneum (optional)
**Uterus, tubes and ovaries and vagina (Figure 2)**

Uterus/ cervix (Fig. 2.1): pool noodle cut into shape of uterus (2.5 in x 5 in) *(may be used several times)*

Ovaries and utero-ovarian ligament (Fig. 2.2): 2 pieces of 1.5 in diameter foam balls cut into the shape of ovaries *(may be used several times)*; 2 pieces of white yarn (6 in), fold each in half, tie ends together to form loop; sew knotted end to ovary to create ligament

Fallopian tubes (Fig. 2.3): pink felt fabric (3 in x 0.5 in)

Vagina (Fig. 2.10): 4-way stretch performance fabric (used for bathing suits and gym outfits- should be thin) (8 in width x ~12 in length) sewn into a 2.5 - 3 in diameter tube

Vulva/ perineum (Fig. 2.11): Felt fabric (8 x 8 in)

**Ligaments (Figure 2)***(error on keeping lengths long as excess can be trimmed later)*

Cardinal & uterosacral ligaments (Fig. 2.4): 4 pieces of ⅛ in white elastic bands (~10 in)

Round ligaments (Fig. 2.5): 2 pieces of white yarn (16 in)

Peritoneum (Fig. 2.6): “Press and Seal” wrap

Areolar tissue (Fig. 2.7): cotton fiber

**Vessels (Figure 2)***(error on keeping lengths long as excess can be trimmed later)*

Infundibulopelvic ligaments (Fig. 2.8): 2 thick red acrylic yarn (~20-22 in)

Uterine vessels (Fig. 2.9): 2 pieces of about thick red acrylic yard (~18-20 in)

![Image of medical simulation materials](Fig 2)
Additional Equipment (Figure 3)
1- 2 Vise-Grip tools/ C-clamps (e.g. Quick-Grip Mini Bar clamp)

Assembly Steps for TVH Simulator: See Addendum A
Set-up of Miya Model
Initial assembly instructions:
1. Take crossbar and short screw and screw into stand, loosen or tighten for 360-degree rotation
2. Take pre-assembled pelvis and place into support stand
3. Insert locking screws into place to secure pelvis, loosen or tighten screws for trendelenburg or reverse trendelenburg

Replacement part instructions:
Vulva
1. Unscrew attachments at both sides and posterior screw below the anus-this also screws into sacrospinous ligament plate
2. Un-attach from pelvic support beam
3. Attach new vulva to support beam
4. Screw both side screws in and posterior screw making sure to secure the sacrospinous ligament in place.

Perineum
1. Remove both sides of perineum from pre cut grooves
2. Insert into pre-cut groves at ischial tuberosities so that length of the perineum forms a “flattened U” shape (much like a smile)

Vagina
1. Remove the three front peg and hole attachment points
2. Remove the lateral endopelvic fascia wings from the slots in the pelvis
3. Push the cervix through the vaginal apex and remove
4. Take new vagina and secure the three peg and hole fasteners
5. Endopelvic wings slide into grooves behind ischial spines
6. Insert cervix into vaginal apex

Uterus
1. Slide pegs out from pre-cut grooves in the pelvis
2. Replace with new uterus making sure uterus is oriented so vascular tubes project posteriorly
3. Insert cervix into vaginal apex, the vaginal opening apex fits very tightly around the groove of the cervix

Bladder
1. Remove from grooves at pubic symphysis one on the top and bottom
2. Replace with new bladder, ensuring the urethra opening is at the bottom of the pubic symphysis