One-Way Tracheostomy Speaking Valve (SV) – Initiation and Maintenance (Adult)

Site Applicability

VCH:

- All VCH sites accepting patients with ventilators and/or tracheostomy tubes

PHC:

- St. Paul's Hospital (SPH)
- Mt. St. Joseph's Hospital (MSJ)

Practice Level

Profession	Basic Skill	Advanced Skill (Requiring additional education) *
Respiratory Therapist (RT)	• Initial placement of the Speaking Valve (SV) in collaboration with Speech Language Pathology (SLP) • Subsequent placement of SV • Maintenance and tolerance of the SV • Removal of the SV	
Registered Nurse (RN), Licensed Practical Nurse (LPN)		• Maintenance and tolerance of the SV • Removal of the SV **NOTE: For *GF Strong (GFS), George Pearson Centre (GPC), Purdy Paviliton (PP), Dogwood Lodge (DL), & Evergreen House (EVG) ONLY, RNs and LPNS may also perform:*** • Subsequent placement of SV • Maintenance /tolerance of SV • Removal of SV

Speech-language Pathologist (SLP)		Requires Certified Practice Certificate H for: • Initial placement of the SV in collaboration with RT • Subsequent placement of SV (non-ventilated patients) • Maintenance and tolerance of the SV • Removal of the SV
Physiotherapist (PT)		• Subsequent placement of SV • Maintenance and tolerance of SV • Removal of SV

Competency Guidance:

In order to achieve competencies:

1. **SLP:** Must have Certified Practice Certificate H: Communication & Swallowing Assessment and Management for Tracheostomy from the College of Speech and Hearing Professionals of British Columbia for placing and removing the SV.
2. **RN, LPN:**
   - Review this DST.
   - Foundational knowledge of tracheostomy and laryngectomy (review competency listed in Tracheostomy and Laryngectomy - Care and Management DST).
   - In person training related to SV maintenance and removal dependent upon unit/department-based requirements and completed by a knowledgeable clinical support person (i.e. RT, Clinical Nurse Educator, or Clinical Resource Nurse).
   - **For GFS, GPC, PP, DL, & EVG Only**: Successful completion of the Provincial Respiratory Outreach Program (PROP) or On-Site Nursing Tracheostomy and Ventilation course.

   NOTE: Any Long-Term Care sites accepting tracheostomy tubes and SVs must obtain local approval by Professional Practice and Operations Directors for LPNs to manage SVs at their site
3. **PT:** PTs regularly required to complete the mentioned skills must complete VCH Physiotherapy Tracheostomy and Speaking Valve Competency Checklist - see Appendix A, with Clinical Mentor, Clinical Resource Therapist or Practice Leader.

Requirements

- Physician order is required to initiate an SV.
- An SV can only be used with a cuffless tracheostomy tube or with cuffed tracheostomy tube where the cuff is COMPLETELY DEFLATED. Notification flag included in SV packaging must be placed on pilot line when using an SV with a cuffed tracheostomy tube (see Appendix B).
- Passy-Muir Valves (PMV) are reserved for in-line use with ventilated patients and require special access authorization from Health Canada for purchase.

Need to Know

- **Safety warning signs** must be posted in a prominent location at the patient's bedside, and on their chart and kardex or care plan. Notification flag must also be attached to the pilot line on cuffed tubes.
- Remove the SV when patient is sleeping.
- Provide supplemental humidification. Heat-moisture-exchangers (HME) do not provide humidity as exhaled air from the patient is re-routed through the upper airway.
- For placement options based on patient interface for oxygen/humidity, see Appendix B.

  NOTE: Caution when using silicone connectors, as heat and moisture can cause the connection to loosen or slip, which may lead to accidental ventilator disconnections. Check and ensure the connections are adequately secured.
- Remove the SV prior to the delivery of aerosolized medication or metered dose inhaler (MDI) delivery to prevent "gumming/sticking" of the SV.
- Remove the SV prior to suction if not using an inline suction set up.
- **High Lesion Spinal Cord Injury:** For patients who have sustained a high lesion spinal cord injury resulting in quadriplegia and are at high risk for a vasovagal reaction, pre-oxygenation may be required prior to SV placement.

Equipment and Supplies

- SV (e.g. Passy Muir Valve (PMV), Shiley)
- SV safety poster (Appendix C)
- Notification flag for pilot line (Appendix B)
- 10 mL syringe
- Suction apparatus, catheters and Yankauer suction
- Personal Protective Equipment (PPE) – see Infection Control Guidelines (VCH / PHC)
- Appropriate oxygen therapy device
- Pulse oximeter
- Emergency airway equipment
- Manual Ventilation Unit (MVU) or Bag-Valve-Mask (BVM) Resuscitation Unit

Procedure

Clinical Benefits and Opportunity:

- Improves voice and speech production
- May improve swallowing and reduce aspiration
- Facilitates secretion management
- Improves olfaction
- Facilitates patient participation in care planning and improves patient mood and quality of life

Indication / Candidacy for use

Many patients with a tracheostomy tube may benefit from a SV, as there are:

- Patients who are unable to tolerate tracheostomy tube plugging
- Patients with respiratory muscle weakness may have an easier time breathing through a SV versus plugging.
- Patients on home ventilators (**Note:** Only the Passy-Muir Brand Tracheostomy Valve may be used in line with a ventilator circuit. The Shiley SV is not approved for this use.)
- Patients who are unable to communicate effectively by non-verbal means.

Selection Criteria

- Tracheostomy tube has been in place for a **minimum of 48 hours and no further swelling and/or bleeding noted from the tracheotomy procedure**
- Patient manages secretion clearance with or without assistance
    - Ability to independently clear secretions effectively **OR**
    - Ability to manage secretions with manual cough or Mechanical Insufflation-Exsufflation (MI-E) in the absence of adequate cough reflex (i.e. spinal cord injured patients or neuromuscular disease)
- Patient can tolerate cuff deflation without risk of gross aspiration of secretions
- Patient can comfortably exhale around cuff down or cuffless tracheostomy tube with finger plugging assessment
- Patient is awake and alert
- Patient has a stable medical status and vital signs (heart rate (HR), blood pressure (BP), respiratory rate (RR), and oxygen saturation [SpO_2])

Contraindications

- Patient has upper airway concerns (e.g. obstruction, tracheal stenosis, or bilateral vocal cord paralysis)
- Patient has laryngectomy or a foam-filled trach tube (e.g. Bivona self-inflating cuffed trach tube)
- Patient is at high risk for vomiting
- Patient has uncontrolled gastroesophageal reflux disease (GERD)
- Patient has copious, thick, and unmanageable secretions requiring frequent suctioning
- Patient has decreased or fluctuating level of consciousness (LOC)
- **NOTE:** Use caution with patients who have other lung pathology resulting in severely reduced lung elasticity (e.g. COPD) as the SV may further increase expiratory work of breathing.

Procedure

A. Prior to SV Placement

1. RT, SLP, RN, and physician collaborate to determine if patient is appropriate for SV.
2. RT and/or SLP educate patient on the purpose of the SV and obtain consent.

3. RT and/or SLP recommend which SV is most appropriate given patient presentation (PMV for in-line use with vented patients; other valves for all other patients).
4. Physician places order for SV placement.

B. Initial SV Placement (RT or SLP only)

NOTE: The RT and SLP will liaise and collaborate prior to initial placement of the SV.

1. Confirm physician's order for SV placement.
2. Don PPE.
3. Position patient in upright position (e.g. semi-fowlers).
4. Make note of baseline HR, BP, RR and SpO_2, Work of Breathing (WOB), breath sounds (particular attention to prolonged expiration), LOC. Consider the use of an $ETCO_2$ nasal monitor.
5. An SpO_2 monitor must be used with audible alarms and volumes set appropriately throughout trial.

   For patients with cuffed tracheostomy tubes:

   - Suction patient orally.
   - Slowly deflate the cuff as tolerated, providing bronchial/oral hygiene as necessary. Provide patient with accessible Yankauer suction, and encourage expectoration of secretions.
   - Obtain another set of vitals (HR, BP, RR, SpO_2 and $EtCO_2$ if applicable) and assess patient for changes in WOB and LOC, or signs of decreased secretion management (excessive coughing).
   - If cuff deflation is not tolerated, re-inflate cuff and re-apply oxygen therapy device. Patient does not qualify for SV use at this time.
   - If cuff deflation is tolerated, determine if patient can exhale comfortably around the tracheostomy tube by finger-plugging the tracheostomy tube. If finger-plugging allows for comfortable exhalation, patient is suitable for SV trial.

   For ventilated patients only (RTs to initiate and maintain SV on ventilated patient):

   Ventilator parameter changes:

   - The RT sets PEEP to zero before application of SV and cuff deflation.
   - For patients in Volume Control (VC) mode: the RT increases the set tidal volume (Vt) at the time of cuff deflation, targeting the average peak inspired pressure (PIP) observed during ventilation with the cuff inflated.
   - FiO_2 may also require adjustment to achieve patient's goal $Sp0_2$.
     - **NOTE:** significant increases in FiO_2 may be indicative of intolerance: assess patient for other signs of intolerance (see Section D).
   - RT checks ventilating pressures after SV placement and adjusts pressure alarms as necessary. RT sets high pressure alarm to a minimum of 10 cmH_2O above noted P_{peak}.

- **NOTE:** Ensure low pressure alarm is set appropriately according to inner cannula low pressure test

6. Explain SV function to patient. Ask patient to communicate if they feel short of breath or unable to exhale fully.
7. Place the SV (See Appendix B).

C. After SV Placement

1. Obtain another set of vitals and assess patient for changes in WOB and LOC, or signs of decreased secretion management/increased production.
2. SLP assesses phonation and speech production and instructs patient on techniques to improve coordination of voice and breathing as needed.
3. Ongoing monitoring of patient progress using the SV is shared by Nursing, SLP and RT.
4. If initial SV placement is not tolerated (see signs of intolerance, see Section D):
   a. Notify the physician
   b. RT assesses if the optimal trach tube is in situ to support the patient during an SV trial
   c. SLP explores alternate ways for the patient to communicate.
5. Place safety posters (See Appendix C) and label for pilot line in patient room if patient tolerates placement and is ready for trials. Notify point of care bedside nurse that trials have commenced.
6. **For Ventilated Patients only**: an ABG must be performed to evaluate ventilator parameter changes during PMV use.

D. Subsequent Initiation of SV Trials

1. Subsequent placement for **ventilated patients** is always done by the RT. Subsequent placement on **non-ventilated patients** can be done by RT, SLP or designate. Clear communication and documentation regarding wearing times and progression of trials is required.

   NOTE: At GFS, GPC, PP, DL, and EVG, RNs and LPNs can perform subsequent placements on days when RT coverage is unavailable, provided the RT has signed off that the patient can use it without RT supervision.
2. RT must provide instruction to Nursing on how to remove the SV and to monitor for signs of intolerance. If signs of intolerance are noted (see below), the SV must be removed immediately and the RT must be notified.
3. If continued trials of SV fail to progress, or there is no observed benefit by SLP, RT, or patient, discuss discontinuation of SV with the physician and patient.

Signs of Intolerance

If any of the following signs develop, remove the SV immediately and monitor the patient or return to pre-trial conditions.

- SpO_2 less than 93 percent or a significant decrease from baseline
- Sustained increase in HR

- Increased WOB and/or tachypnea
- Decrease in LOC
- Inability to manage secretions effectively (i.e. persistent coughing, increased sputum production), increased upper airway congestion or increased need for suctioning
- In ventilator dependent patients, the inability to ventilate effectively due to excessive leak despite compensation with higher pressures or volumes, or excessively high peak pressures
- Patient distress and/or discomfort
- Stridor

Cleaning and Maintenance

1. The SV is designed for single patient use only
2. The SV must be replaced if it vibrates, is sticky or noisy, or exhibits increased resistance on inspiration
3. Clean the valve daily after the last usage and PRN.
    a. Swish SV in sterile water with alcohol free soap to remove visible debris (Do NOT use brushes, cotton tipped applicators, alcohol, peroxide, bleach, vinegar, or hot water. Do not autoclave.)
    b. Rinse thoroughly using a fresh supply of sterile water
    c. Place on clean gauze to air-dry
    d. Once dry, place in storage container labeled with patient's name.
4. If the valve membrane becomes displaced by forceful exhalation or cough, it can be pushed back in with a sterile-tipped cotton applicator.

Education

Refer to the Passy-Muir Website for educational videos, on-line modules and literature specific to the PMV. (Note: The PMV is a **bias-closed position no-leak speaking** valve, and the Shiley One-Way Speaking Valve is an open position valve).

For patient education, refer to the Tracheostomy Speaking Valve poster provided during education by RT or SLP. This poster can be used to explain SV risks and benefits while obtaining consent. Also, refer to Passy Muir webpage FAQ page Troubleshooting/FAQ/www.passy-muir.com for patient specific education.

Teach the patient and family in a language they can understand. An interpreter (virtual or in person) may be needed to assist.

Related Documents

Guidelines/Procedures/Forms

VCH:

- Tracheostomy and Laryngectomy - Care and Management

PHC:

- Dysphagia Management - Acute Care

References

O'Connor, L. R., Morris, N. R., & Paratz, J. (2019). Physiological and clinical outcomes associated with use of one-way speaking valves on tracheostomised patients: A systematic review. Heart & Lung, 48(4), 356-364.

Freeman-Sanderson, A. L., Togher, L., Elkins, M. R., & Phipps, P. R. (2016). Return of voice for ventilated tracheostomy patients in ICU: a randomized controlled trial of early-targeted intervention. *Critical Care Medicine*, *44*(6), 1075-1081.

O'Connor, L. R., Morris, N., & Paratz, J. (2021). The safety and efficacy of prolonged use of one-way speaking valves. *Australian Critical Care*, *34*(4), 319-326.

Bonvento, B., Wallace, S., Lynch, J., Coe, B., & McGrath, B. A. (2017). Role of the multidisciplinary team in the care of the tracheostomy patient. *Journal of multidisciplinary healthcare*, *10*, 391.

Kutsukutsa, J., Kuupiel, D., Monori-Kiss, A., del Rey-Puech, P., & Mashamba-Thompson, T. P. (2019). Tracheostomy decannulation methods and procedures for assessing readiness for decannulation in adults: a systematic scoping review. *JBI Evidence Implementation*, *17*(2), 74-91.

Li, J., Perez, A., Schehl, J., Albers, A., & Husain, I. A. (2021). The Association Between Upper Airway Patency and Speaking Valve Trial Tolerance for Patients With Tracheostomy: A Clinical Retrospective Study and an In Vitro Study. *American Journal of Speech-Language Pathology*, 1-9.

Passy-Muir Tracheostomy and Ventilator Speaking Valve and Resource Guide http://www.passy-muir.com/sites/default/files/pdf/resource_guide.pdf

Appendices

- Appendix A: VCH Physiotherapy Tracheostomy and Speaking Valve Competency Checklist
- Appendix B: Speaking Valve Placement with Oxygen and Humidification Devices
- Appendix C: Passy-Muir Tracheostomy Valve Poster

Appendix A: VCH Physiotherapy Tracheostomy and Speaking Valve Competency Checklist

Document Type	Clinical Competency Checklist
Document Name	VCH Physiotherapy Speaking Valve Competency Checklist
Owner	Physiotherapy
Effective from	December, 2023

Stage of Development	Process
Self – Assessment (SA)	Self-assess all skills listed on the checklist using the below scoring system to identify areas of learning needs. *Competency Assessment Levels (Benner's Model of Clinical Competency)* Score – Competency Level – Description 1 – Beginner – Limited knowledge of this task. I need instruction and guidance to complete it 2 – Advanced Beginner – Working knowledge of this skill and some practical experience but need some guidance to complete it 3 – Competent – Good working knowledge of this task. I can complete most of it using my own judgment, but guidance with complex or unexpected situations 4 – Proficient – Well developed knowledge and experience with this task. I can be responsive and adapt my practice in new situations. 5 – Expert – Deep understanding and ability to teach others in this task. I can predict and adapt my practice in complex situation.
Teaching (T)	Teaching will be provided to attain all components of skills checklist. Place the date in the row once teaching has been completed
Further Learning (FT)	Place a "Y" or "N" to indicate whether or not further training is needed to feel confident/competent with each skill listed

Skill 1: Tracheostomy	SA	T	FL
1.1 Understanding of indications for tracheostomy			
1.2 Understanding of anatomical structures of upper airway and position of tracheostomy tube			
1.3 Knowledge of physiological changes when patients have a tracheostomy			
1.4 Ability to identify different types and size of tracheostomies (including cuffed and cuffless)			
1.5 Understanding of role of inner cannula and how to remove in emergency situation			
1.6 Demonstrated ability to complete tracheal suctioning			
1.7 Demonstrated ability to appropriately monitor patients response to treatment and signs that indicate a patient is NOT tolerating a session			
1.8 Ability to identify and assess whether a cuff is up, down or a leak present			
1.9 Understanding of implications of cuff down and secretion management			
1.10 Aware of the safety equipment required to be with tracheostomy patients' at all times (including ambulation)			
1.11 Ability to use an Ambu-bag with a tracheostomy attachment in emergency situation			
1.12 Understanding of usual weaning pathway of tracheostomy on your unit			
Skill 2: Laryngectomy (if applicable on unit)			
1.13 Understand anatomical changes in patients post Laryngectomy (e.g. no upper airway)			
1.14 Understand differences between tracheostomy and laryngectomy tubes			
1.15 Understand how emergency procedure differs from tracheostomy patients (i.e. never provide 02 or bag via nose/mouth)			
Skill 2: Speaking Valve (SV)			
2.1 Understanding of how SVs work and the benefits			
2.2 Understanding of the different types of SV's and when they are used (Shiley vs. Passy Muir Valve (PMV))			
2.3 Clear understanding on purpose of cuff deflation and to never use a SV with the cuff up			
2.4 Understanding of unit specific PT role in subsequent placement and removal of SV in patients with a cuffless trach			
2.5 Demonstrated ability to remove SV when using cough assist machine, breath-staking bag, emergency bagging or tracheal suctioning (when no inline suction present)			
2.6 Aware of role in pre-oxygenating prior to SV placement or suction in high Spinal Cord Injured patients			
2.7 Knowledge of the clinical signs required to be monitored while treating patients with SV in situ as well as signs of non-tolerance			
2.8 Demonstrated ability to collaborate with team members on SV care plan (trach changes, SV trials or long term use)			
2.9 Aware of the VCH DST - One-Way Tracheostomy Speaking Valve (SV) – Initiation and Maintenance (Adult) document for practice guidelines			

PT Scope

VCH all areas: Removal and replacement of SV for airway clearance. Monitoring of clients' tolerance of SV.

VGH Spine Unit, GF Strong, LTC and Community: In addition to above, subsequent SV placement in patients with a cuffless trach and stable daily SV plan with known tolerance.

Education Resources

Self-study Webinar Home | Welcome to Passy Muir - (The Speaking Valve) (passy-muir.com). *Application of the Passy-Muir Swallowing and Speaking Valves. Ventilator Application of Passy-Muir Valve*

Shiley Speaking valve: shiley-speaking-valves-product-brochure.pdf (medtronic.com)

Tracheostomy Weaning Pathway

Tracheotomy Tube: Cuff Deflation

Tracheostomy and Laryngectomy – Care and Management

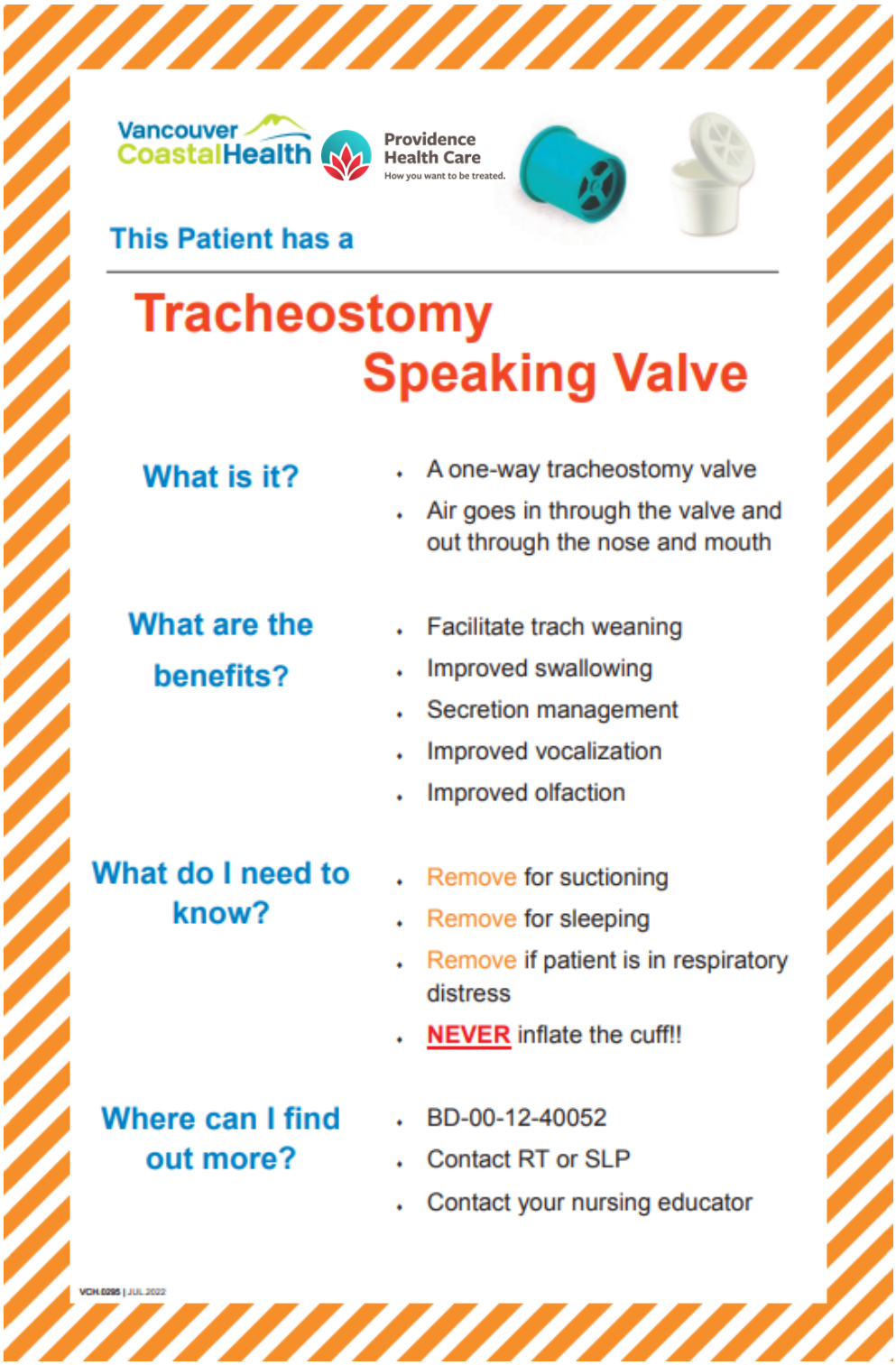
Appendix B: Speaking Valve Placement with Oxygen and Ventilation Devices:

Non-Ventilated Patients (Shiley Speaking Valve):	
Shiley Speaking Valve and Trach Mask:  	
Non-Ventilated Patients (In-Line Suction + High-Flow):	
PMV with 22x15 connector and Optiflow interface 	PMV with Silicone connector and Optiflow interface 

Ventilated Patients:	
In-Line, PMV, 22x15 connector, flextube 	In-Line, PMV, silicone connector, flextube 
Swivel adapter, PMV, 22x15 connector, flextube 	Swivel adapter, PMV, silicone connector, flextube 

Image credits: Garrett Whitsitt

Appendix C: Tracheostomy Speaking Valve Poster (VCH.0295)



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	PHC Professional Practice Standards Committee	VCH: (Regional DST Endorsement - 2nd Reading) Health Authority & Area Specific Interprofessional Advisory Council Chairs (HA/AIAC) Operations Directors Professional Practice Directors Final Sign Off: Vice President, Professional Practice & Chief Clinical Information Officer, VCH
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