

17C. Chronic Kidney Disease / Acute Kidney Injury

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17C. Clinical Care of Patients with Chronic Kidney Disease (CKD) and Acute Kidney Injury During an Influenza Pandemic

For patients with end-stage renal disease, renal dialysis treatments and kidney transplants are their only treatment options. Dialysis treatment can be either in the form of hemodialysis or peritoneal dialysis, depending on the patient's clinical condition and choice.

At any given time, approximately .07% of Ontarians – or over 8,503 people – are receiving dialysis and other treatments – including transplants – for chronic kidney disease (CKD) or acute kidney injury. According to the Canadian Institute for Health Information (CIHI) 2007 report, *Treatment of End-Stage Organ Failure in Canada, 1996-2005*, in 2005, 20.6% of all Ontario dialysis patients were receiving peritoneal dialysis and 79.4% were receiving hemodialysis. In the event of an influenza pandemic, these life-saving treatments must be maintained.

The Ministry of Health and Long-Term Care funds a coordinated, accessible, high quality and cost-efficient system of services for patients with CKD and acute kidney injury. Programs in Ontario are currently organized in a *hub-and-spoke* model that consists of 26 regional centres, 64 satellites, 7 Independent Health Facilities (IHF). Peritoneal dialysis services are also provided in partnership with Ontario's 14 Community Care Access Centres and the long-term care sector.

Ontario dialysis facilities practice in an interdisciplinary model of care and provide the following services:

- chronic renal disease management and education
- pre-dialysis education, including information about dialysis options

- creation and maintenance of vascular access for dialysis treatment
- patient dialysis training
- dialysis treatments, either at home or in a facility, and follow-up care
- renal transplantation services.

See Appendix 1 for a detailed description of the CKD Model of Care.

1. Objectives

The objectives of pandemic planning for clinical care of patients with CKD and acute kidney injury are:

- To maintain essential kidney treatment and services during a pandemic.
- To make the most effective use of limited human and other resources.
- To be transparent and accountable to the public.

2. Planning Assumptions

Pandemic planning for kidney care and treatment is based on the following assumptions:

- These guidelines apply to patients with chronic kidney disease (CKD) and to patients who have acute kidney injury (i.e., abrupt, sustained decrease in kidney function) – with and without influenza – during an influenza pandemic.
- CKD patients who have influenza are at high risk for complications. It is essential to segregate patients with influenza-like illness (ILI) from patients without ILI symptoms and treat as quickly as possible. Patients

with ILI will continue to receive treatments for their CKD or kidney injury but will be cohorted/segregated appropriately (e.g., Independent Health Facilities may only dialyze non-ILI patients because they do not have the capacity to segregate patients).

- Over the duration of the pandemic, 35% of staff – including clerical staff, aides, RNs, dialysis technicians, social workers, nephrologists and the leadership team – will have influenza or will not be able to work because of family responsibilities. There will be a peak loss of up to 20 to 25%.

- For general planning assumptions for an influenza pandemic, see OHPIP Chapter 3.

3. Clinical Services

Table 17C.1 lists the clinical services provided by the province’s Regional Programs. Clinical decisions (e.g., where services will be provided and by whom) will be made locally by the Regional Program. See Appendix 2 for a description of these services.

Table 17C.1: Clinical Services Provided by Regional Programs

Program	Services
1. Acute Kidney Injury Program	<ul style="list-style-type: none"> • ICU services for previously healthy individuals who have abrupt sustained decrease in kidney function – see Table 17C.3 on RIFLE criteria • Continuous Renal Replacement Therapy (CRRT) – done in hospital by intensivists or nephrologists, depending on the program
2. Chronic Kidney Disease Program	<ul style="list-style-type: none"> • Pre-dialysis and treatment options clinics • Nephrology clinics – chronic kidney disease management
3. In Centre Dialysis Program*	<ul style="list-style-type: none"> • Level I Chronic Hemodialysis • Level II Chronic Hemodialysis • Level III Acute Hemodialysis • Hemoperfusion services (where available) • In-hospital peritoneal exchanges • Follow-up clinics
4. Home Dialysis Program (including peritoneal dialysis done in long-term care homes)	<p>Training</p> <ul style="list-style-type: none"> • Home hemodialysis/daily or nocturnal • Continuous ambulatory peritoneal dialysis (CAPD) • Continuous cycler peritoneal dialysis (CCPD) <p>Maintenance</p> <ul style="list-style-type: none"> • CAPD • CCPD adult • CCPD pediatric • Home hemodialysis <p>Home visits</p> <ul style="list-style-type: none"> • Nursing visits (follow-up) • Technician visits (equipment repair and maintenance)
5. Body Access Creation and Maintenance	<ul style="list-style-type: none"> • Central venous catheter insertions (permanent) • Central venous catheter insertions (temporary) • AV fistula/graft insertions • PD catheter insertions
6. Transplant Program**	<ul style="list-style-type: none"> • Cadaver donor • Living donor • Those waiting for a transplant and those who have had transplants (post transplant clinics)

* Includes residents of long-term care home transported to the Centre for hemodialysis

**Responsibility for transplant programs is shared between transplant centres and CKD programs.

4. Recommended Strategies

To maintain essential programs and services during an influenza pandemic, CKD Regional Programs and practitioners may consider the following strategies:

1. Prioritize patient needs/ deferring non-essential services
2. Organize/ deliver services in different ways
3. Develop human resource contingency plans
4. Develop a decision-making process/ agreements between centres and sites to provide mutual aid.

4.1 Prioritize Patient Needs and Services

During an influenza pandemic, programs and sites may not have the capacity (i.e., people, equipment) to treat all patients according to current clinical treatment guidelines. In the event that treatment services must be altered, reduced or deferred, CKD Regional Programs should use a consistent approach to prioritizing patient needs and providing clinical services. These guidelines provide a priority classification system to help CKD Regional Programs identify priority needs and determine which patients are treated, where and when. The classification system is based on an ethical framework using the principles of critical care triage (Chapter 17) and ethical guidelines in Cancer Service Planning (Chapter 17A-19), including:

- All patients will be treated fairly based on need (justice)
- All patients will receive care but, based on their stage of kidney disease (table 17C.2) or level of kidney injury (table 17C.3) and actual/ projected treatment

efficacy, some may receive comfort care rather than active treatment

- Treatment choices will take into account the patient’s prognosis and chance of survival.

Stage of kidney disease or level of acute kidney injury is based on specific diagnostic measures, which are used to indicate disease progression from mild to severe, pre-dialysis to dialysis:

Table 17C.2: Stages of Kidney Disease*

Stage	Glomerular Filtration Rate
Stage 1	Kidney damage with normal or increased glomerular filtration rate (eGFR greater than or equal to 90 ml/min/1.73m ²)
Stage 2	Kidney damage with mild decrease in GFR (eGFR 60-89 ml/min/1.73m ²)
Stage 3	Moderate decrease in GFR (eGFR 30-59 ml/min/1.73m ²)
Stage 4	Severe decrease in GFR (eGFR 15-29 ml/min/1.73m ²)
Stage 5	Kidney Failure (eGFR less than 15 ml/min/1.73m ²) or dialysis)

*Adapted from the American Journal of Kidney Disease 2002; 39 (2, Suppl.1) S46-S75.

Table 17C.3: RIFLE (Risk, Injury, Failure, Loss and End-stage Kidney Disease Classification of Acute Kidney Injury

Class	Glomerular Filtration Rate	Urine Output Criteria
Risk	Serum creatinine x 1.5	<0.5 ml/kg/hour x 6 hours
Injury	Serum creatinine x 2	<0.5 ml/kg/hour x 12 hours
Failure	Serum creatinine x 3, or serum creatinine ≥ 350 micromol/L with an acute rise >44 micromol/L	<0.3 ml/kg/hour x 24 hours, or anuria x 12 hours
Loss	Persistent acute renal failure – complete loss of kidney function >4 weeks	
End-stage kidney disease	End-stage kidney disease >3 months	

Priority Classifications

Table 17C.4 describes the criteria for prioritizing patient need and gives

examples of the types of patients that would fall in each priority category.

Table 17C.4: Criteria for Prioritizing Patient Needs

Priority	Description	Examples
Priority A	Patients who are deemed critical, whose condition is immediately life threatening. Their immediate need is greatest and Regional Programs must find ways (either within the geographic area of the pandemic or elsewhere*) where treatment can be instituted or continued.	<p>Acute Kidney Injury Patients</p> <ul style="list-style-type: none"> Patients whose injury or kidney failure requires immediate treatment to avoid permanent loss of function. <p>End Stage Renal Disease (ESRD) Patients</p> <ul style="list-style-type: none"> All ESRD patients who progress to Stage 5 and who require life sustaining treatments (i.e., chronic hemodialysis patients, peritoneal dialysis patients) Any home hemo / PD patient whose dialysis access has failed, which, if not corrected, will prevent dialysis from being initiated. <p>Creation of Body Access to Make Dialysis Possible</p> <ul style="list-style-type: none"> Urgent vascular access surgery patients. Patients with urgent PD catheter issues. Any dialysis access failing or in jeopardy. <p>Transplant Patients</p> <ul style="list-style-type: none"> Stage 4 & 5 ESRD patients for whom a cadaveric kidney is available for transplant (depending on availability of OR space and staff). Post-renal transplant patients with Stage 5 kidney disease who require renal replacement therapy Any medically unstable kidney transplant patient requiring frequent medical review.
Priority B	Patients whose condition is not deemed to be life threatening, for whom services can be deferred or discontinued over the course of a pandemic wave (6 to 8 weeks). Physicians will determine that these patients are not put at undue risk. If their situation changes they will be moved to priority A .	<p>Progressive Renal Insufficiency (PRI)</p> <ul style="list-style-type: none"> PRI patients who require urgent clinic visits. <p>Transplant Patients</p> <ul style="list-style-type: none"> Post-renal transplant patients who require urgent clinic visits. Recently transplanted patients requiring ongoing monitoring to avoid organ rejection. <p>Home Dialysis Program</p> <ul style="list-style-type: none"> Home hemodialysis and PD patients who are near the end of home training should complete training and be sent home.
Priority C	Patients whose condition is deemed non-life threatening and for whom services can be discontinued for the duration of the pandemic. These patients are, for the most part, undergoing routine follow-up or screening and can reasonably wait until all waves of the pandemic are over (i.e., 6 to 18 months).	<p>Ambulatory Clinics</p> <ul style="list-style-type: none"> Based on their clinical condition, all patients attending ambulatory care clinics, except transplant and PRI patients who have urgent needs. <p>New installations for home hemodialysis</p> <p>Follow-up Clinics</p> <ul style="list-style-type: none"> Home Dialysis Clinic patients who do not fit priority A or B.

* It is anticipated that each wave of the pandemic will occur in a particular geographic area of the province so that clinics and hospitals in other parts of the province can be utilized for Priority A patients when necessary. In the event of a widespread pandemic where this is not possible, the same criteria will be used to prioritize, but not all Priority A patients may receive prompt treatment.

It is the ethical responsibility of the practitioner, often with consultation, to evaluate each individual patient fairly, using the fundamental criteria of need and

actual or projected efficacy of treatment, to categorize the patient as Priority A, B or C.

Deferring Services/Patient Care Processes

It is the responsibility of the CKD Regional Program leadership to evaluate the level of service its programs will be able to provide during a pandemic, using these same criteria to identify priority services and services that can be deferred, and to plan care delivery for patients within their jurisdiction, including patients in their partnered satellite sites. All programs will review patient care processes, and identify those that can be deferred either temporarily or for the duration of the pandemic (e.g., assessing feet, conducting audits).

Appeals

Any patient or family appeals of decisions regarding prioritization should be referred to existing hospital review / appeal committees or the hospital

ombudsman. Every effort should be made to ensure there is someone with expertise in renal care on the review committee. Consideration should be given to providing patient/family advocates.

4.2 Organizing/Delivering Services in Different Ways

During an influenza pandemic, services for chronic kidney patients may be delayed or disrupted, patients may have to go to different sites for dialysis, and they may have to rely more on self-care.

Programs should consider the following strategies for planning, organizing and delivering services during a pandemic, which are based on the WHO pandemic phases (See Chapter 2: Roles, Responsibilities and Frameworks for Decision-Making – for the WHO Pandemic Periods and Phases).

Table 17C5: Planning Activities for CKD Model of Care by Pandemic Phase

Program	Actions During the Pandemic Alert Period (phases 3 to 5)	Actions During the Pandemic Period (phase 6)
1. Acute Kidney Injury	<ul style="list-style-type: none"> Review chapter 17 on acute care, including critical care triage 	<ul style="list-style-type: none"> Implement plans in conjunction with critical care
2. Chronic Kidney Disease	<ul style="list-style-type: none"> Develop a plan to decrease or suspend ambulatory care clinics Identify one site within a given geographic area to act as an urgent clinic for Priority A patients Identify medically unstable patients and develop a process to monitor them closely, identify urgent needs and manage medical complications Develop a communication plan to keep patients and families informed Develop self-care materials and tools for patients and families 	<ul style="list-style-type: none"> Implement plans to decrease non-essential services Send notice or letter to all patients informing them that scheduled appointments will be cancelled during the pandemic, and telling Priority A patients where to call for information and go for urgent care, if necessary Distribute self-care materials for patients (e.g., diet) through the Kidney Foundation and the Regional Programs Determine whether additional clinic hours may be required post-pandemic to deal with the backlog
3. In-Centre Dialysis	<ul style="list-style-type: none"> Identify and train patients who could be managed using home PD or home hemodialysis during the course of a pandemic Develop process to make it easier for hemodialysis patients to enter centre during a pandemic (e.g., ID cards, ID cards for escorts or other arrangements, such as wheelchairs if escorts not allowed) Develop a process for assessing time and frequency of hemodialysis on a case-by-case basis, (e.g., based on clinical judgment), reduce 	<ul style="list-style-type: none"> Send notice or letter to all patients informing them how services will change during an influenza pandemic, where they should call for information and, if necessary, where they should go for care Issue ID cards to all patients who require in-centre hemodialysis so they can enter the facility easily Implement plan to manage off-unit patients

Program	Actions During the Pandemic Alert Period (phases 3 to 5)	Actions During the Pandemic Period (phase 6)
	<p>the hours spent (e.g., 4 to 2 hours) or the frequency of dialysis (e.g., 3 to 2 times per week); use this information to identify operating hours and staffing required</p> <ul style="list-style-type: none"> • Develop plans to manage off-unit patients during a pandemic – given that capacity to provide off-unit hemodialysis may be impacted by in-unit activity and availability of nursing/medical/technical staff • In the event of shortage of machine time, develop backup plan to initiate peritoneal dialysis in the event of a shortage of machine time or to open up a fourth (night time) shift for in-centre patients to increase capacity for hemodialysis • Establish plan to maintain water treatment systems • Develop plan to optimize machine maintenance and address any medical/machine issues • Identify any reserve machines • Identify medically unstable patients and develop a process to monitor them closely; identify urgent needs and manage medical complications • Identify ways to cohort/separate patients with ILI if possible; if not possible, identify other ways to reduce exposure to ILI (e.g., having patients wear masks) • Work with patient transportation services to develop contingency plan to ensure patient transportation to and from the centre – including transportation for residents of long-term care homes • Develop a communication plan to keep patients and families informed • Develop plans with dialysis suppliers to maintain ongoing supplies of equipment, solutions, medications, and consumables for current and prospective new patients 	<ul style="list-style-type: none"> • Adjust doses of antivirals to compensate for the clearing of antivirals during dialysis
<p>4. Home Dialysis</p>	<ul style="list-style-type: none"> • Identify any additional support that home dialysis patients may need to remain at home and avoid unnecessary ER visits • Work with CCACs to plan to maintain home hemodialysis and peritoneal dialysis services during a pandemic • Work with long-term care homes to maintain dialysis services for residents • Work with long-term care homes to develop a coordinated communication plan to keep residents and families informed • Explore other options for dialysis, such as shifting from continuous cycling peritoneal dialysis (CCPD) to continuous ambulatory peritoneal dialysis (CAPD) • Develop information and tools on self-care • Develop plans with dialysis and pharmaceutical suppliers to maintain ongoing supplies of equipment, solutions, medications, and consumables 	<ul style="list-style-type: none"> • Send information to patients telling them who to call if their condition worsens, and maintain communications throughout pandemic • Distribute information and tools to help patients with self-care • Maintain communication with CCACs and long-term care homes
<p>5. Body Access Creation and Maintenance</p>	<ul style="list-style-type: none"> • Confirm OR/radiology/diagnostic imaging plans/availability to maintain urgent vascular access surgery and manage PD catheter complications • Develop plans to address any complications related to maintaining body access 	<ul style="list-style-type: none"> • Implement plans • Provide information to patients about where to go with any access maintenance problems
<p>6. Transplant Program</p>	<ul style="list-style-type: none"> • Develop plan to maintain urgent transplant clinic • Develop plan to screen urgent patients for ILI 	<ul style="list-style-type: none"> • Implement plans • Distribute information to patients • Schedule urgent transplant clinic at a

Program	Actions During the Pandemic Alert Period (phases 3 to 5)	Actions During the Pandemic Period (phase 6)
	<ul style="list-style-type: none"> • Confirm OR plan for renal transplantation • Develop process to make it easier for transplant patients to enter centre during a pandemic (e.g., ID cards) • Develop a communication plan to keep patients and families informed 	<p>frequency determined by the transplant centre. Transplant patients would need to continue lab work to determine appropriate level of immunosuppression.</p>
Infection Control	<ul style="list-style-type: none"> • Conduct an initial assessment of the department to identify specific infection control issues that may need to be addressed during a pandemic. Initial assessment should involve Medical Director, manager and infection control coordinator • Train staff in the appropriate use of personal protective equipment (PPE) • Consider patient flow <ul style="list-style-type: none"> • Maintain two metre separation • Define cohorting plans • Define appointments for patients (not to arrive prior to appointment time to prevent too many patients in waiting room at the same time) • Consider increase in housekeeping needs • Restrict access for family / support persons • Discuss transport issues – develop alternative if current transport not available 	<ul style="list-style-type: none"> • Plan for initial consult with infection control coordinator first week of outbreak and determine need for consultation as pandemic continues (i.e., twice a week) • Provide education pertaining to infection control to staff, patients and family / support persons <ul style="list-style-type: none"> • Ensure language is not a barrier in education (tools should provide picture and written information) • Review use of PPE • Reinforce hand hygiene
General	<ul style="list-style-type: none"> • Establish communication protocols for regional programs so all sites have appropriate contact numbers and give patients a consistent message • Work with facilities to develop plans to screen patients for ILI, including concise, accurate screening tools are available that will allow rapid assessment • Develop workload measurement tools and reports • Confirm process for ordering/receiving lab reports during a pandemic • Confirm with pharmacy and labs how to maintain adequate supplies of immunosuppressants, other pharmaceuticals and solutions, and laboratory services. Review renal specific pharmacy needs and alert pharmacy to ensure adequate supply of pharmaceuticals and solutions 	<ul style="list-style-type: none"> • Screen patients by phone for ILI before their appointment; if patient has ILI symptoms, review case with nephrologists and reschedule if possible • If, based on the patient's condition, appointments can not be deferred, schedule appointments for patients with ILI symptoms at the end of the clinic day • Ask patients with ILI to wear a mask and assess them in a designated isolation room • Review diets with patients and reinforce how important it is to follow diets and take prescribed and over-the-counter drugs as directed • Maintain data and review statistical reports at end of phase 6

4.3 Managing In-Centre Dialysis Patients with Influenza

Assessment

During a pandemic, patients will be assessed for symptoms of ILI at the designated CKD entrance of the facility. Hemodialysis patients will be given priority for assessments (e.g., ID cards that identify as hemodialysis patients).

All patients entering the facility will be asked to use alcohol-based hand rub. In addition, patients exhibiting signs or symptoms of ILI will don a mask.

Patients should also be assessed at a designated location at the unit level before entering into the unit.

Triaging/Cohorting

Ideally, ILI patients should be dialyzed in a separate room if possible. If this is not practical, patients may need to be dialyzed in an open concept unit environment, maintaining a minimum of 2 metre / 6 feet between patients, and placing a portable plastic screen around each patient.

Assuming up to one quarter of hemodialysis patients may have influenza at the peak of

the pandemic wave, up to one quarter of the in-centre hemodialysis units will need to be turned into a modified segregated area. Staff will wear appropriate PPE (see chapter 7). Minimal supplies should be taken into the isolation zone of each unit.

Treatment with Antivirals

Ontario has stockpiled enough antivirals to treat 25% of the general population (or the proportion that is expected to require treatment). CKD and AKD patients with ILI will be treated with antivirals. However, because antivirals may be filtered out in the dialysis process, dosages may have to be adjusted for kidney failure patients.

Treatment with Antibiotics

Patients will be treated with antibiotics when clinically indicated following usual practice.

4.4 Managing Home Dialysis Patients with Influenza

Regional Programs should instruct patients undergoing home dialysis on what to do if they develop ILI, including:

- Do not go to the hospital
- If they can still do their own dialysis, they should contact Telehealth, their primary care provider or CCAC, and seek medical attention and antiviral treatment as soon as possible.
- If they are unable to do their own dialysis, they should contact the home dialysis unit.

Regional programs may also consider the need to educate or support local health care providers / facilities to ensure they understand the needs of CKD patients.

5. Staffing/Human Resource Contingency Plans

Caring for people with kidney failure/disease – particularly those who

require hemodialysis and peritoneal dialysis – requires highly specialized skills. To develop a staffing contingency plan:

- identify the skill sets needed in your area as part of hospital global competency planning (i.e., hemodialysis, peritoneal dialysis, general medicine, nursing, venapuncture). (See Chapter 8, competency-based approach to HHR planning).

Nursing

- Assume that nurse-patient ratios will be altered during the pandemic and that the nursing aides, dialysis technicians and other nephrology RNs as well as members of the leadership team will/may be providing direct patient care in the hemodialysis areas.
- Maintain list of recently retired nurses willing to come back to assist in an emergency.
- If nursing staff on orientation are near the beginning of training they could return to their in-patient units; if they are near the end of their training they should be assigned to patients whose needs match their skills.
- Consider allocating kidney research nurses and other nurses with nephrology knowledge/ experience for clinical support as appropriate.
- CKD nurses with specialized knowledge and skills should not be redeployed to areas other than the Nephrology Program.

Infection Control

- Ensure that Nephrology Infection Control support is available.

**Management/Educators/
Administrative Staff**

- Managers and educators should be available for unit operation support 24/7 during the pandemic. Plans should be developed and communicated to all
- Manager and educator of each unit could be “buddied” for day hours of operation (i.e., if one is off, the other covers.)
- After 1600 hrs, consider creating a rotating perpetual on-call calendar where there is either a manager or educator on from 1400-2400 and 2400-0800 for support to all units. Would require 2 staff per night, 7 nights per week. On weekends, on call schedule could be developed for days as well, requiring one person per Saturday and one per Sunday.

Social Work

- Focus on priority tasks, such as crisis intervention and adjustment counselling services for patients, critical incident/stress debriefing for team members, and distress support for families if decision is made to discontinue dialysis
- Identify community resources that could assist and provide appropriate training.

Dietitian

- Develop plan to maintain dietitian services, as diet and fluid restriction will be important interventions if treatment regimens have to change
- Identify community resources that could assist and provide appropriate training.

Clerical and Support Staff

- Redeploy some clerical staff with routine clerical skills if needed
- Redeploy dietitians, social workers, and pharmacists if necessary.

Housekeeping

- Develop plan to maintain strict cleaning standards during a pandemic
- Identify and educate other hospital housekeeping staff in cleaning protocols in a dialysis unit.

Nephrologists

- Develop a plan to maintain nephrology services during a pandemic
- Determine whether nephrologists primarily working in research could provide support to clinical areas
- Identify other physicians who may be able to provide service in a nephrology unit
- Develop mutual aid agreements with other nephrology programs
- Identify international medical graduates with training in nephrology.

Nephrology Technical Services

- Develop a plan to maintain dialysis related equipment and assign technical staff to emergency repairs as needed
- Develop reciprocal arrangements with other dialysis units to provide technical support
- Explore the role vendors could play in maintaining equipment.

Leadership Role

Administrators/Educators should:

- use the incident management system described in Chapter 2, and integrate with the facility's own Incident Management System (IMS) plan
- focus on coordination of activities
- establish a routine reporting schedule
- hold daily debriefing and planning sessions with the full team including all disciplines
- assign a manager/educator team to assume responsibility for each unit
- establish a plan to cover the responsibilities of absent managers and educators
- create and update a list of all non-hemo nephrology nursing skills.

5. Support for Staff

During an influenza pandemic, health care workers are likely to be working extended or extra shifts in an environment with high levels of stress. As part of pandemic preparedness, CKD Regional Programs should identify psychosocial support services provided by their facilities that will help health care workers fulfill their responsibilities. In addition to the services provided by employee assistance programs, facilities may consider providing:

- regular daily debriefings for staff
- access to counselling
- advice about self-care
- assistance with child care, elder care, pet care, meals and other home responsibilities.

6. Equipment and Supply Needs

Regional Programs are responsible for maintaining a four-week stockpile of infection control equipment and supplies. The Ministry of Health and Long-Term Care will maintain another four-week stockpile of infection prevention and control supplies that programs can access.

Please refer to the Equipment and Supplies guidelines, Chapter 10.

In addition, Regional Programs are responsible for planning to maintain dialysis supplies – including purchasing, storing and managing supplies – for both in-centre and home programs. Someone on the team should be assigned responsibility for identifying the essential types and quantities of supplies that will be required to support care for CKD, AKD and PD patients.

As most Programs do not have a lot of storage space and currently use a just-in-time approach to supplies management, they may have to negotiate with vendors to ensure an adequate source of dialysis supplies (e.g., four-week stockpile) during a pandemic.

7. Next Steps

The working group will develop:

- a surveillance system to track daily dialysis capacity across the province and recommendations for mutual agreements to re-refer patients with potentially life-threatening or rapidly progressing curable/manageable CKD to other regions
- a guidance document for transplant programs
- a plan for biomedical nephrology technical support, including a list of technologies in use across the province

(i.e., number and type of machines), the number of technicians, and their skills

- a plan to maintain paediatric nephrology services during a pandemic
- guidelines for segregating and cohorting ILI patients
- provincial guidelines for transporting patients to and from dialysis units
- a plan to ensure CCAC and long-term care home (LTCH) capacity to maintain dialysis services (i.e., home dialysis for CCAC clients and peritoneal dialysis for LTCH residents), and ongoing support for care in these sites from the Regional Programs during a pandemic, including guidelines for the management of clients/residents with ILI (to be developed collaboratively with CCACs and LTCHs)
- guidelines for decision-making and handling appeals at all sites that are part of the Regional Program
- information for pharmacists
- self-care information for patients.

Appendix 1: Chronic Kidney Disease Model of Care

Regional Centre

- the Hub of the network for a defined geographic region
- provides administrative, programmatic and clinical expertise to support patients at all levels of care for the full continuum of care
- responsible, accountable and has authority for CKD care throughout its assigned catchment area, including the areas served by its satellite operations
- responsible for leading the organization and administration of the regional program, program development and strategic direction, implementation and coordination of CKD clinical care and provision of quality patient care
- responsible for all planning within their region, including establishing processes for Triage patients, and ensuring a triage function is in place
- responsible for overseeing the management of all levels of CKD patients and the coordination and integration of services within its network
- assumes responsibility for the direct care of any patient being treated within the region and must maintain the ability and capacity to meet fallback needs without delay (i.e., meet the needs of patients treated in satellites who require Regional Centre services)
- must have dedicated in-patient bed capacity and associated support services to support the complex clinical needs of the Regional Centre and its satellites
- maintains linkages with tertiary centres

- direct recipients of funding for CKD services; Regional Centre is responsible for the distribution of funds to their Satellites including funding for all new CKD programs.

The Regional Centres are responsible for providing a full range of services to patients with CKD including:

- clinics – pre-dialysis and treatment options, nephrology and follow-up
- home visits by nursing and technical personnel
- maintenance of patients on PD
- maintenance of patients on HD
- vascular access support including vascular surgery and interventional radiology
- PD catheter insertion
- Chronic and acute HD
- Training for patients who wish to perform their own PD or HD
- Service availability 24 hours per day, seven days per week.

If a Regional Centre cannot independently provide all of the services listed above, the Centre is responsible for ensuring access to these services for the region through negotiated agreements with other facilities that provide guaranteed access to services within 24 hours where appropriate (i.e., vascular access care, complex care), and within reasonable timelines for other services. The Regional Centre maintains a linkage with a tertiary health science centre for clinically complex patients.

Satellites

- have full affiliation with a regional centre
- provide hemodialysis (HD) treatment for chronic CKD patients within their geographic catchment area including stable and sometimes unstable patients
- responsible for leadership, program development, implementation and coordination of CKD care throughout their catchment area across the continuum of care
- multidisciplinary team associated with the Regional Centre oversees the care of patients receiving HD treatments at a satellite
- clear transfer protocols in place between the Regional Centre and the Satellite for transfer of dialysis patients, should the need arise
- receive Ministry funding for CKD services from a Regional Centre.

Long-Term Care Home (LTCH) PD Satellite

- Formal partnership between CKD Regional Programs and eligible LTC homes
- Provide PD only to residents of the LTCH
- CKD Programs responsible for coordination and support of in-centre hemodialysis provided for LTCH residents, PD services in designated LTC homes as well as ongoing monitoring and evaluation of performance.

CCACs

- Provide support to PD clients in their home in accordance with PD care standards

- Partnered with CKD programs in accordance with a Memorandum of Understanding with the partnered CKD Program
- Funding received from the Acute Hospital Replacement allocation budget.

Independent Health Facilities

- Governed under separate statute, The independent Health Facilities Act Ontario, and accredited by the College of Physicians and Surgeons of Ontario
- Provide HD only to chronic stable patients.

Tertiary Centres

- Participate as a specialized care provider in the regional service plan
- Provide specialized diagnosis and treatment and access to a full continuum of nephrology care, including kidney transplant assessment and transplantation, chronic and acute dialysis treatment on an inpatient or outpatient basis for populations within their primary catchment area
- Share knowledge, expertise and research findings related to nephrology care.

Appendix 2: Chronic Kidney Disease Program Modalities & Definitions

Modality	Definition	Measured by:
Level I - Chronic Hemodialysis SATELLITES AND REGIONAL CENTRES	Hemodialysis treatment for <i>stable</i> chronic ESRD patients – self-care, assisted self-care or dependent full care. The interdisciplinary team hours may be variable, as they relate to patient acuity. The team hours per treatment will not exceed 2.25 hours. Staff:Patient Ratio is 1:4.	number of treatments (e.g. patient dialyzes between 3-5 hours per treatment)
Level II - Chronic Hemodialysis REGIONAL CENTRES ONLY	Hemodialysis treatment, performed in an acute care dialysis unit located in a hospital, for unstable, chronic and acute ESRD patients. The patients are of high acuity, may be unstable during the dialysis procedure and must be seen by a Nephrologist each visit. The interdisciplinary team hours may be variable, as they relate to patient acuity. The hours of care will be 2.26 to 3.25 hours. Staff:Patient Ratio 1:3.	number of treatments (e.g., patient dialyzes between 3-5 hours per treatment)
Level III - Acute Hemodialysis REGIONAL CENTRES ONLY	Hemodialysis treatment performed on acutely ill patients in-hospital in an acute care unit outside the dialysis unit (e.g., adult/paediatric intensive care unit, cardiac care unit, burn unit). The interdisciplinary team hours of care will be equal to or greater than 3.26 hours.	number of treatments
Hemoperfused REGIONAL CENTRES ONLY	This extracorporeal treatment is performed on acutely ill patients in an acute care unit such as intensive care unit and includes the use of a charcoal filter (such as those that are used to manage an overdose). Each treatment includes 1 filter per 4 hours of nursing time.	number of treatments
CRRT REGIONAL CENTRES ONLY	Continuous Renal Replacement Therapy (CRRT) is performed on acutely ill patients in an Acute Care Unit area such as Intensive Care. This code includes hemodialysis backup for the ICU staff for starts or restarts, as well as 1 filter per day.	number of treatment days
In-hospital Peritoneal Exchanges REGIONAL CENTRES ONLY	This includes manual peritoneal dialysis (PD) bag changes for patients on CAPD (continuous ambulatory peritoneal dialysis) for acutely ill patients performed in-hospital. This also includes automated exchanges using a cycling device (CCPD) or continuous acute care cycling.	number of procedures (e.g., patient dialyzes between 4-5 times per day)
Training - Home/Self-care Hemodialysis Treatments	An intensive education period for the hemodialysis patient who subsequently will be able to manage his/her own treatment in the home/self-care unit. This period, which may include the training, takes a variable number of days (range of 18-24 treatment days), which includes the cost for hemodialysis treatment during the training period.	number of days trained
Training - CAPD	An intensive education session for a peritoneal dialysis patient undertaking to learn to manage personal peritoneal dialysis in the home. The training may or may not occur in a patient's home. This training takes a variable number of days. Costing includes both training days as well as the Peritoneal Dialysis exchanges done during training. Average training time, including the initial home visit, typically varies from 4-8 days (average of 5 days).	number of days trained
Training -CCPD	An intensive education session for a peritoneal dialysis patient undertaking to learn to manage personal cyclical peritoneal dialysis in the home. The training may or may not occur in a patient's home. This training takes a variable number of days. Costing includes both training days as well as the peritoneal dialysis exchanges done during the training. Average training time, including the initial home visit, typically varies from 4-8 days (average of 5 days).	number of days trained

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Maintenance - CAPD	Continual ambulatory peritoneal dialysis is a type of peritoneal dialysis in which patients receive 4-5 peritoneal dialysis exchanges each day utilizing 2-3 litres of dialysate each exchange. This treatment may be carried out in a patient's home. A night exchange device may be used to enable this patient to do 1 extra peritoneal dialysis exchange during the night.	number of annualized patients (e.g., patients on this treatment over a year)
Maintenance - CCPD - Adult	In continual cyler peritoneal dialysis (CCPD) - Adult, a peritoneal dialysis patient utilizes a cycling machine to do several peritoneal dialysis exchanges, usually throughout the night. Such patients frequently do peritoneal dialysis exchanges during the day as well.	number of annualized patients (e.g., patients on this treatment over a year)
Maintenance - CCPD - Child	In continual cyler peritoneal dialysis (child) a paediatric peritoneal dialysis patient utilizes a cycling machine to do several peritoneal dialysis exchanges throughout the night. Such patients may also do peritoneal dialysis exchanges during the day.	number of annualized patients (e.g., patients on this treatment over a year)
Maintenance - Home Hemodialysis	Hemodialysis treatments for the hemodialysis patients, usually performed three times per week in the homes. This is done by the patient or with the help of an unpaid trained assistant such as a family member. In some circumstances a paid trained assistant is required (currently the payer is either a private insurance plan or via the hospital concerned). If the patient is admitted to hospital, then he/she should not be counted as a home hemodialysis patient.	number of annualized patients (e.g., patients on this treatment over a year)
Home Visits - Nursing & Technician	Home or satellite unit visit of interdisciplinary team member (e.g., nursing, dietician, physiotherapist, etc.) or biomedical technical staff for the purpose of patient/equipment care and support. The time spent for each visit includes travelling time (to and from) and visiting time. Travelling time is dependent on where the home or the satellite is located. Visiting time is dependent on the purpose of the visit (i.e., follow-up visit/replacement and/or machine repair).	number of hours for each visit
Clinics - Pre-dialysis and Treatment Options	Interdisciplinary outpatient clinic dedicated to the assessment, medical management, treatment and support of patients with creatinine over 250 ummol/L. Education provided to families and patients regarding normal/abnormal renal function, renal failure, treatment options, nutrition, medications, and lifestyle and adjustment issues.	number of visits
Clinics - Nephrology	Outpatient clinic visit dedicated to the treatment of nephrological conditions for patients with creatinine less than 250 ummol/L.	number of visits
Clinics - Follow-Up Visits	Follow-up clinic visits are a clinical assessment of the patient having hemodialysis or peritoneal dialysis done at home, or at a satellite or an independent health facility which occurs under one of two circumstances: <ul style="list-style-type: none"> • Patient undergoes a multi-disciplinary team assessment as well as laboratory testing at the Regional Centre, • A multi-disciplinary team from the Regional Centre visits the satellite dialysis units to provide clinical assessment to a patient dialysing in that unit. The clinical assessment would include laboratory testing. 	number of visits
Peritoneal Equilibrium Test CAPD/CCPD	A procedure involving a 4 hour peritoneal dialysis exchange done in the clinic under supervised conditions with sampling of blood and dialysate on a number of occasions during that 4 hour period. This should be done on all patients during or shortly after initial training and repeated when clinically indicated (e.g., 1 per year).	number of tests
Insertion -Vascular Graft Insertion	Surgically implanting a graft of synthetic material (between an artery and a vein) into a patient with end	number of procedures (e.g., one

Modality	Definition	Measured by:
	stage renal disease to be used for hemodialysis treatment.	procedure would be on insertion)
Insertion - Central Venous Catheter Temporary	Insertion of a temporary venous line into a patient with acute or chronic failure to be used for hemodialysis treatment.	number of procedures (e.g., one procedure would be on insertion)
Insertion - Central Venous Catheter Permanent	Insertion of a permanent catheter (i.e.: Perm Cath) into a patient with end stage renal disease to be used for long term hemodialysis treatment.	number of procedures (e.g., one procedure would be on insertion)
Insertion - AV Fistula	Surgical creation of an arterial-venous (AV) fistula into a patient with end stage renal disease to be used for hemodialysis access.	number of procedures (e.g., one procedure would be on insertion)
Insertion - Peritoneal Dialysis Catheter	Inserting a permanent catheter into a patient with end stage renal disease to be used for any form of peritoneal dialysis.	number of procedures (e.g., one procedure would be on insertion)