Oncology Learning Network

Subcutaneous Immuno-Oncology for Genitourinary Cancers:

Clinical Context, Patient Value, and Practice Implementation

IO is a defining component of treatment for GU cancers, particularly RCC and bladder cancer. With multiple effective regimens now available, treatment value is assessed not only by efficacy but also by how therapy is delivered. This infographic reviews the current GU IO landscape, the 2 anti–PD-1 agents with approved SC formulations, the patient-level advantages of SC delivery, and the practical steps for integrating SC IO into oncology practice.

Standard IO Options for the GU Landscape and Unmet Needs

IO is now embedded across multiple settings in RCC (adjuvant after nephrectomy, first-line systemic therapy) and bladder cancer (locally advanced, metastatic, perioperative, and maintenance).[1-3] Despite multiple recommended combination regimens, head-to-head comparative data are lacking. InAs, particularly with IO/IO combinations, remain a key consideration in regimen selection and long-term patient quality of life.[1]

Renal Cell Carcinoma

First-line standard of care for advanced clear-cell RCC[1]:

- Axitinib + pembrolizumab
- Cabozantinib + nivolumab
- Ipilimumab + nivolumab
- Lenvatinib + pembrolizumab

Adjuvant for clear cell histology[1]:

- Pembrolizumab

Bladder / Urothelial Cancer

First-line standard of care for locally advanced or metastatic disease[2]:

- Enfortumab vedotin + pembrolizumab

Alternative first-line strategies[2,3]:

- Platinum-based chemotherapy followed by avelumab maintenance
- Nivolumab + gemcitabine + cisplatin followed by nivolumab maintenance

Perioperative and adjuvant strategies[2]:

- Neoadjuvant cisplatin-based chemotherapy
- Adjuvant nivolumab (for patients with residual disease after neoadjuvant therapy)

Efficacy
Weigh strength of evidence for each regimen in the absence of head-to-head data.

Toxicity
Balance durable response against the risk of irAEs.

Fit
Match regimen intensity to disease and patient profile.

Time
Reduce treatment time burden for patients and clinic staff.

> With multiple recommended IO regimens for RCC and bladder cancer but no head-to-head comparative data, providers face genuine uncertainty around how to tailor treatments. The route of delivery (IV or SC) is one additional lever for personalizing care without lowering confidence in the therapy itself.[4]

SC IO Options Available for GU Cancers

As of May 2026, there are 5 approved IO therapies for RCC and bladder cancer.[1-3] All anti–PD-L1 inhibitors (avelumab, durvalumab, and atezolizumab) are administered intravenously. Only the anti–PD-1 inhibitors (pembrolizumab and nivolumab) have FDA-approved subcutaneous formulations.[5,6]

Medication Profiles

Nivolumab + hyaluronidase-nvhy
Subcutaneous anti–PD-1[6]

RCC indications:

- First-line monotherapy for intermediate- or poor-risk advanced RCC following combination IV nivolumab + ipilimumab
- In combination with cabozantinib for advanced RCC
- Monotherapy for advanced RCC in patients who have received prior anti-angiogenic therapy

Urothelial carcinoma indications:

- First-line combination therapy
- Adjuvant therapy
- Patients at high risk of recurrence after radical resection of UC
- Patients with locally advanced or metastatic UC who have progression during or after platinum-containing chemotherapy
- Patients with locally advanced or metastatic UC who have disease progression within 12 months of neoadjuvant or adjuvant treatment with platinum-containing chemotherapy

Pembrolizumab + Berahyaluronidase alfa-pmph
Subcutaneous anti–PD-1[5]

RCC indications:

- In combination with axitinib or lenvatinib for first-line treatment of advanced RCC
- Adjuvant treatment for patients at intermediate-high or high risk of recurrence following nephrectomy, or following nephrectomy and resection of metastatic lesions

Urothelial carcinoma indications:

- In combination with enfortumab vedotin for locally advanced or metastatic disease
- Monotherapy in select urothelial settings
- Neoadjuvant and adjuvant for cisplatin-ineligible muscle invasive bladder cancer (with enfortumab vedotin)
- Monotherapy for BCG-unresponsive, high-risk non-muscle invasive bladder cancer with carcinoma in situ (NMIBC)

Supporting Evidence

CheckMate 67T
Supporting SC nivolumab[7]

Design:
Phase 3, open-label, randomized noninferiority trial

Population:
Advanced or metastatic clear cell RCC

SC arm:
Nivolumab 1200 mg coformulated with rHuPH20 20,000 units Q4W

IV arm:
Nivolumab 3 mg/kg Q2W

KEY FINDING
Comparable pharmacokinetics, ORR, and safety profile between SC and IV nivolumab

MK-3475A-D77
Supporting SC pembrolizumab[8]

Design:
Phase 3, open-label, randomized noninferiority trial

Population:
Metastatic non-small cell lung cancer with platinum-doublet chemotherapy

SC arm:
Pembrolizumab 790 mg Q6W

IV arm:
Pembrolizumab 400 mg Q6W (18 cycles)

KEY FINDING
Noninferior exposure; efficacy and safety consistent with IV pembrolizumab

STEP 1
Known IV efficacy and safety
The IV formulation establishes the clinical foundation.

STEP 2
Bridging evidence
Comparable pharmacokinetics, efficacy, and safety between SC and IV.

STEP 3
GU use
Follows the labeled indication, with the anti–PD-1 backbone preserved.

Note: SC nivolumab for urothelial carcinoma is supported by IV nivolumab trial data together with pharmacokinetic and safety data demonstrating comparability between IV and SC formulations.[9,10]

Advantages of SC IO for Patients

The strongest patient-facing advantage of SC IO is reduced time spent receiving treatment, a meaningful but often underrecognized burden of cancer care. Time spent in the clinic affects treatment decisions, quality of life, and the well-being of both patients and caregivers.[4,11]

Regimen	Administration Time
Nivolumab, IV[6]	30 min
Nivolumab, SC[6]	3 to 5 min
Pembrolizumab, IV[5]	30 min
Pembrolizumab, SC[5]	~ 2 min (Q6W)

Note: Times reflect drug administration only.[6,8,12] *Combination IV regimens (eg, IV ipilimumab-adds an additional 30 minutes after nivolumab[6]; platinum-doublet chemotherapy is administered sequentially on the same day[13]) substantially extend total chair time. Actual clinic time varies with labs, assessment, scheduling, observation, and local workflow.*[4,11]

CheckMate 8KX

In the CheckMate 8KX phase 1/2 study, patients reported preference for SC nivolumab over IV or no preference. Most patients reported that SC administration took less time than they expected, with no negative impact on time available to talk to a healthcare professional or interact with others.[8,14]

- Significantly shorter drug administration time
- Reduced need for venous access and central venous access devices
- Fewer logistical disruptions (transportation, parking, waiting)
- Lessened caregiver burden
- Less time away from work and family responsibilities

CheckMate 67T

The CheckMate 67T safety profile was consistent between SC and IV arms with no new safety signals identified. Injection-site reactions associated with SC administration must be monitored and incorporated into AE management protocols.[10]

Implementing SC IO in Clinical Practice

For oncology practices, SC IO offers operational opportunities and requires thoughtful integration planning. Implementation begins with a practical assessment of how patients move through the clinic, which areas of operation are affected, and how staff and pharmacy workflows can be adapted to support a faster administration route.[10,11,15]

Staffing
Frees HCP time for patient education and toxicity management.[4]

Scheduling
Shorter visits reduce in-clinic time burden.[4,16]

Pharmacy Operations
Streamlined workflows with ready-to-administer SC formulations. Reduced compounding time and sterile-prep workload improves pharmacy efficiency.[4,16]

Patient Flow
More predictable visit times; frees infusion chairs for therapies requiring longer monitoring.[4,16]

Shorter Visits
More scheduling flexibility for patients and clinics.[4]

More Patients / Day
Increased throughput without expanding physical clinic space.[16]

Infusion Capacity Freed
Chairs available for complex IV therapies that require longer monitoring.[4]

Lower Operational Costs
Reduced chair use, nursing time, and pharmacy resource use per visit.[4,16]

Nursing Considerations for SC IO May Include:

- Product-specific administration requirements and injection technique
- Site selection and rotation
- Local injection-site reaction assessment
- Observation practices and documentation
- Continued screening for systemic irAEs (diarrhea, rash, respiratory symptoms, endocrine changes, hepatic abnormalities)

Shorter administration time can create the opportunity to redirect part of the visit toward assessment, patient education, and care coordination.

SC IO offers a meaningful opportunity to improve patient experience and clinic efficiency. Its benefits are most fully realized when implementation is supported by coordinated planning across staffing, scheduling, pharmacy operations, nursing education, and patient communication.

AE, adverse event; BCG, Bacillus Calmette-Guerin; FDA, US Food and Drug Administration; GU, genitourinary; HCP, healthcare provider; IO, immuno-oncology; irAE, immune-related adverse event; IV, intravenous; NMIBC, non-muscle invasive bladder cancer; ORR, objective response rate; PD-1, programmed cell death protein 1; PD-L1, programmed death-ligand 1; Q2W, every 2 weeks; Q4W, every 4 weeks; Q6W, every 6 weeks; RCC, renal cell carcinoma; SC, subcutaneous.

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