Oncologist's Corner:

Conversations with Cancer Experts About Novel Delivery Options with Immune Checkpoint Inhibitors

ANNENBERG CENTER FOR HEALTH SCIENCES
AT EISENHOWER
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Immune Checkpoint Inhibitors (ICIs) in Oncology

Transformative survival benefits with ICI monotherapy and combinations across multiple disease states

Colon cancer

Head and neck cancers

Lung cancer

Melanoma

Historically, ICIs administered as IV infusions over 30-60 mins creating several operational and patient burdens

Line access requirements

Chair-time burden

IV compounding requirements

Several immune checkpoint inhibitor products are available or being investigated as a subcutaneous (SC) formulation

Atezolizumab hyaluronidase (FDA approved)

Nivolumab hyaluronidase (FDA approved)

Pembrolizumab berahyaluronidase (undergoing clinical trial evaluation)

1. Shiravand Y, et al. *Curr Oncol*. 2022;29(5):3044-3060. 2. Dall'Olio FG, et al. *Nat Rev Clin Oncol.* 2022;19(2):75-90. 3. Keytruda. Prescribing information. Merck, Inc. 2025. Accessed June 10, 2025. https://www.accessdata.fda.gov/drugsatfda_docs/label/2025/125514s172lbl.pdf. 4. Opdivo. Prescribing information. Bristol-Myers Squibb Company. Published 2024. Accessed June 10, 2025. https://www.accessdata.fda.gov/drugsatfda_docs/label/2024/125554s128lbl.pdf. 5. Tecentriq. Prescribing information. Genentech, Inc. Published 2024. Accessed June 10, 2025. https://www.accessdata.fda.gov/drugsatfda_docs/label/2024/761034s053lbl.pdf

Benefits & Challenges of Subcutaneous Immune Checkpoint Inhibitors

Benefits

- Patient convenience/preference
  - Short (5-10 min) injection
  - No IV access required
- Operational efficiency
  - Shorter chair time
  - Reduced preparation/compounding time/materials
- Reduction in infusion-related reactions

Challenges

- Increase in injection site reactions
- Nursing resources/time required for SC administration
  - Higher acuity administration for nursing team
  - Use of SC infusion pump
- Potential risk for medication errors
  - IV formulation given via SC
- Operational/Cost Considerations
  - Lack of unique J-code at product launch
  - Reimbursement concerns

1. Fortner B, et al. *Oncology.* 2009;23(2 Suppl 1):31-36. 2. Smith GL, et al. *J Natl Compr Canc Netw.* 2019;17(10):1184-1192. 3. Cook G, et al. *Front Oncol.* 2023;13:1063144. 4. Boudreau A. *Can Oncol Nurs J.* 2019;29(4):267-270. 5. Inoue Y. *Transl Lung Cancer Res.* 2024;13(4):947-951. 6. Moeller J, et al. *Transl Lung Cancer Res.* 2024;13(6):1444-1449. 7. McCloskey C, et al. *Pharmacoecon Open.* 2023;7(1):3-36.

Atezolizumab SC Clinical Trial: IMscin001

Part 1 → Phase 1b trial

- Atezolizumab 1800 mg SC once every 3 wks or 1200 mg SC once every 2 wks
- Both SC doses and dosing schedules provided similar concentration and area under the curve values
- Safety profile consistent with IV atezolizumab

Part 2 → Phase 3 confirmatory trial (Metastatic Non-Small Cell Lung Cancer)

- Atezolizumab 1875 mg SC (n=274) or 1200 mg IV (n=124) once every 3 wks
- Concentration and area under the curve comparisons were **noninferior**
- Progression-free survival → 2.8 mos for SC vs 2.9 mos for IV (HR 1.08)
- Objective response rate → 12% for SC vs 10% for IV
- Safety: mild injection site reactions (4.5% for SC); safety profile similar between SC and IV

~7 min SC injection time

1. Burotto M, et al. *Ann Oncol.* 2023;34(8):693-702. 2. U.S. Food & Drug Administration. Published September 12, 2024. Accessed June 29, 2025. https://www.fda.gov/drugs/resources-information-approved-drugs/fda-approves-atezolizumab-and-hyaluronidase-tqjs-subcutaneous-injection

Nivolumab SC Clinical Trials

CheckMate8KX → Phase 1/2 trial

- Nivolumab SC administered at doses of 960 mg and 1200 mg
- Both SC doses provided mean exposure of nivolumab greater than mean exposure of IV nivolumab
- Safety profile consistent with IV nivolumab and no new safety concerns (~28% mild injection site reactions)

CheckMate-67T → Phase 3 confirmatory trial (Renal Cell Carcinoma)

- Nivolumab 1200 mg SC (n=248) once every 4 wks or 3 mg/kg IV (n=247) once every 2 wks
- Concentration and pharmacokinetic endpoints were **noninferior**
- Progression-free survival → 6.34 mos for SC vs 5.65 mos for IV (HR 1.06)
- Objective response rate → 24.2% for SC vs 18.2% for IV
- Safety: mild injection site reactions (8.1% for SC); safety profile similar between SC and IV

~3-5 min SC injection time

1. Lonardi S, et al. *J Clin Oncol.* 2021;39(Suppl 15):2575. 2. George S, et al. *J Clin Oncol.* 2024;42:LBA360. 3. Opdivo Qvantig. Prescribing information. Bristol-Myers Squibb Company. Published 2025. Accessed June 29, 2025. https://www.accessdata.fda.gov/drugsatfda_docs/label/2024/761381s000lbl.pdf

Pembrolizumab SC Clinical Trials

KEYNOTE-555 → Phase 1 trial (Metastatic Melanoma)

- Pembrolizumab 285 mg SC (2 different concentration formulations utilized) administered x 2 doses (patient then received IV)
- Both SC formulations had similar pharmacokinetic data to IV pembrolizumab
- Safety profile consistent with IV pembrolizumab and no new safety concerns (mild injection site reactions)

MK-3475A-D77 → Phase 3 confirmatory trial (Ongoing)

- Pembrolizumab 790 mg SC (n=251) once every 6 wks plus chemotherapy or 400 mg IV (n=126) once every 6 wks
- Metastatic non-small cell lung cancer population
- Trial has met primary pharmacokinetic endpoints as **noninferior**
- Objective response rate was 45.4% for SC arm and 42.1% for IV arm
- Median SC administration time was 2 min

Currently Not FDA Approved*

1. Jacobs CR, et al. *Cancer Res. 2021;*81(13 Suppl):CT143. 2. Merck. Published November 19, 2024. Accessed June 29, 2025. https://www.merck.com/news/merck-announces-phase-3-trial-of-subcutaneous-pembrolizumab-with-berahyaluronidase-alfa-met-primary-endpoints/

Best Practices for Workflow Optimization of SC Immune Checkpoint Inhibitors

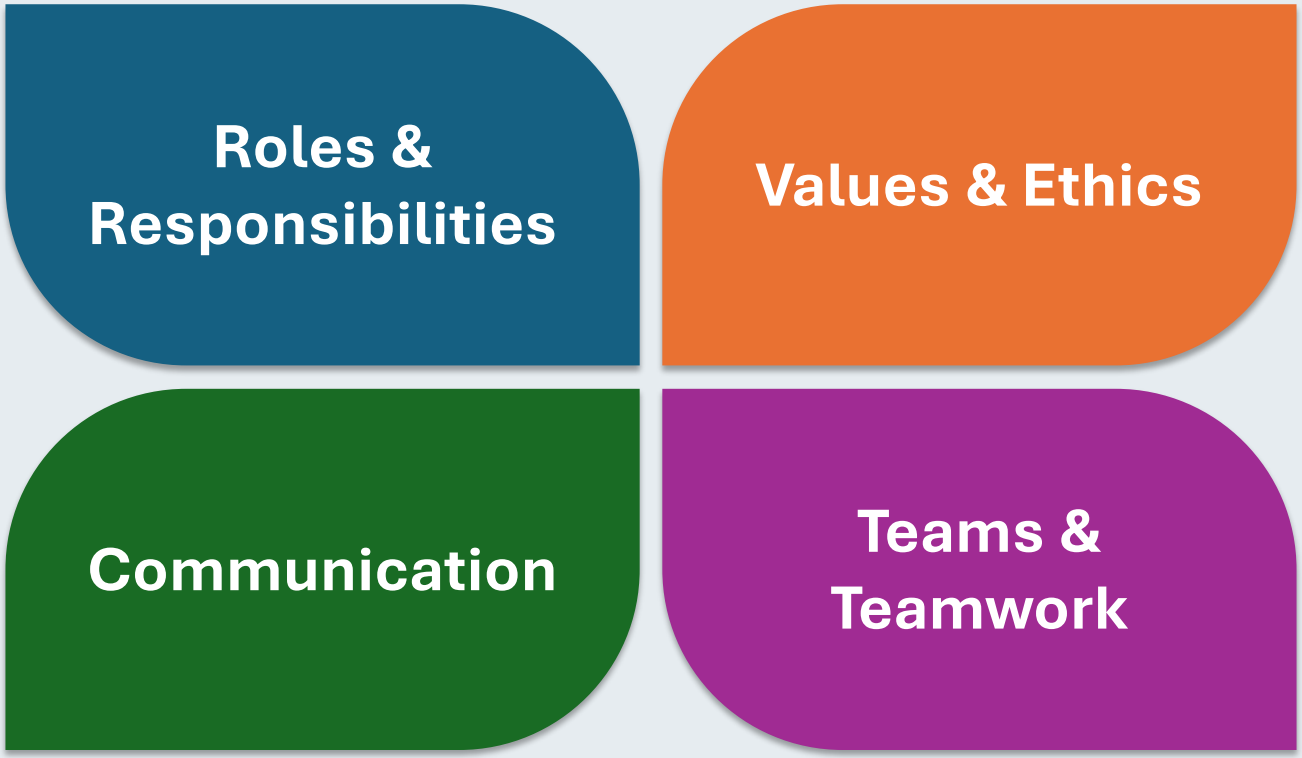
- Development of department champions/subcommittees as necessary
- Proactive engagement and collaboration with interprofessional/multidisciplinary team
- Proper integration and utilization of tools/resources for SC optimization (EHR, education materials)
- Identify potential barriers early on through regular evaluation, follow-up, and feedback from key teams/stakeholders

1. Boudreau A. *Can Oncol Nurs J*. 2019;29(4):267-270. 2. Law NLW, et al. *BMJ Open*. 2024;14(2):e079559. 3. Soukup T, et al. *BJS Open*. 2022;6(4):zrac093.

Interprofessional Continuing Education

Key Concepts, Principles, Benefits

Interprofessional Collaboration Emphasizes Behavioral Competencies



Interprofessional Education Collaborative. Published 2023. https://www.ipecollaborative.org/assets/core-competencies/IPEC_Core_Competencies_Version_3_2023.pdf

Interprofessional Collaboration Emphasizes Behavioral Competencies

Roles & Responsibilities

Use the knowledge of one's own role and team members' expertise to address individual and population health outcomes

Interprofessional Education Collaborative. Published 2023. https://www.ipecollaborative.org/assets/core-competencies/IPEC_Core_Competencies_Version_3_2023.pdf

Interprofessional Collaboration Emphasizes Behavioral Competencies

Values & Ethics

Work with team members to maintain a climate of shared values, ethical conduct, and mutual respect

Interprofessional Education Collaborative. Published 2023. https://www.ipecollaborative.org/assets/core-competencies/IPEC_Core_Competencies_Version_3_2023.pdf

Interprofessional Collaboration Emphasizes Behavioral Competencies

Communication

Communicate in a responsive, responsible, respectful, and compassionate manner with team members

Interprofessional Education Collaborative. Published 2023. https://www.ipecollaborative.org/assets/core-competencies/IPEC_Core_Competencies_Version_3_2023.pdf

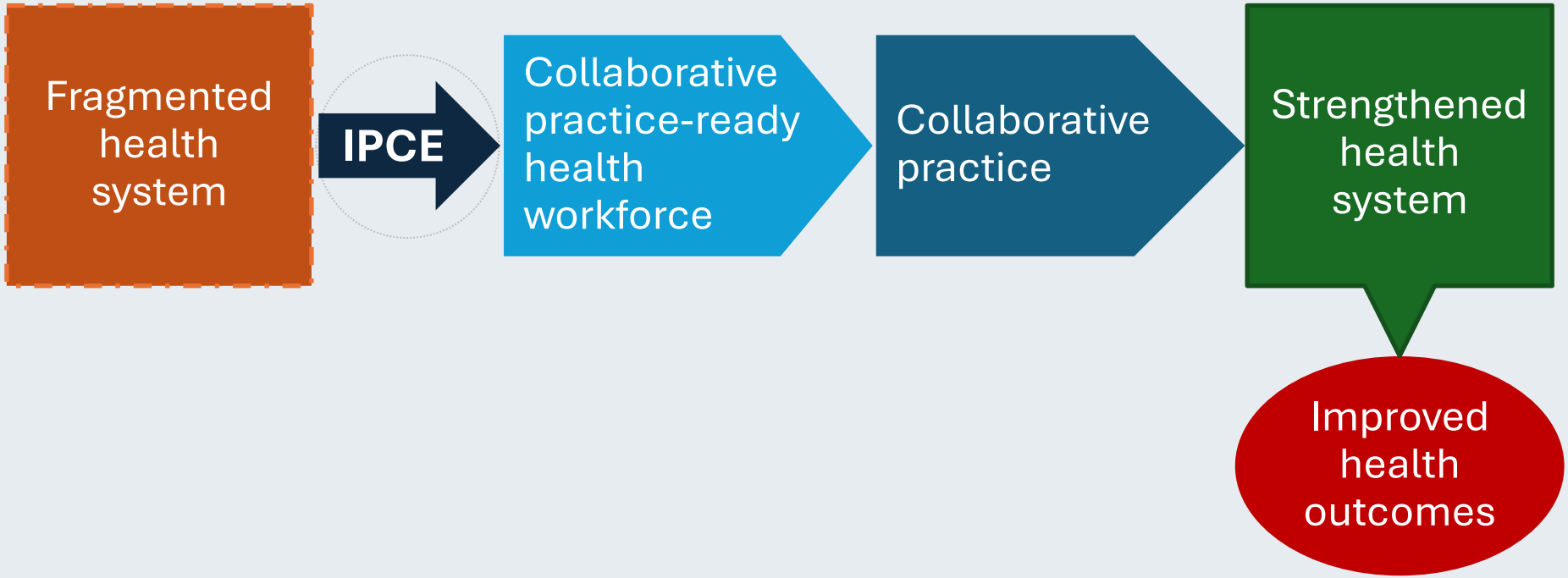
Interprofessional Collaboration Emphasizes Behavioral Competencies

Teams & Teamwork

Apply values and principles of the science of teamwork to adapt one's own role in a variety of team settings

Interprofessional Education Collaborative. Published 2023. https://www.ipecollaborative.org/assets/core-competencies/IPEC_Core_Competencies_Version_3_2023.pdf

IPCE and Collaborative Practice Framework



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