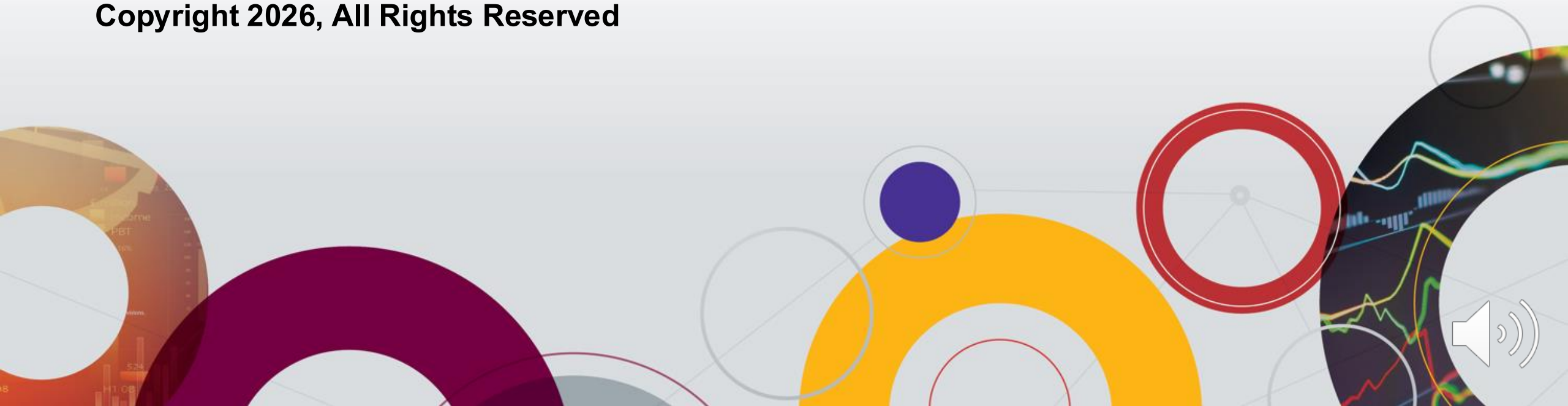


7.3a Telemedicine and Telehealth

10x10 – Introduction to Biomedical Informatics & Artificial Intelligence
William Hersh, MD, FACMI, FAMIA, FIAHSI
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Telemedicine and telehealth

Definitions of telemedicine, telehealth, and related terms

Usage

Research results

Policy issues

Future directions

Definitions

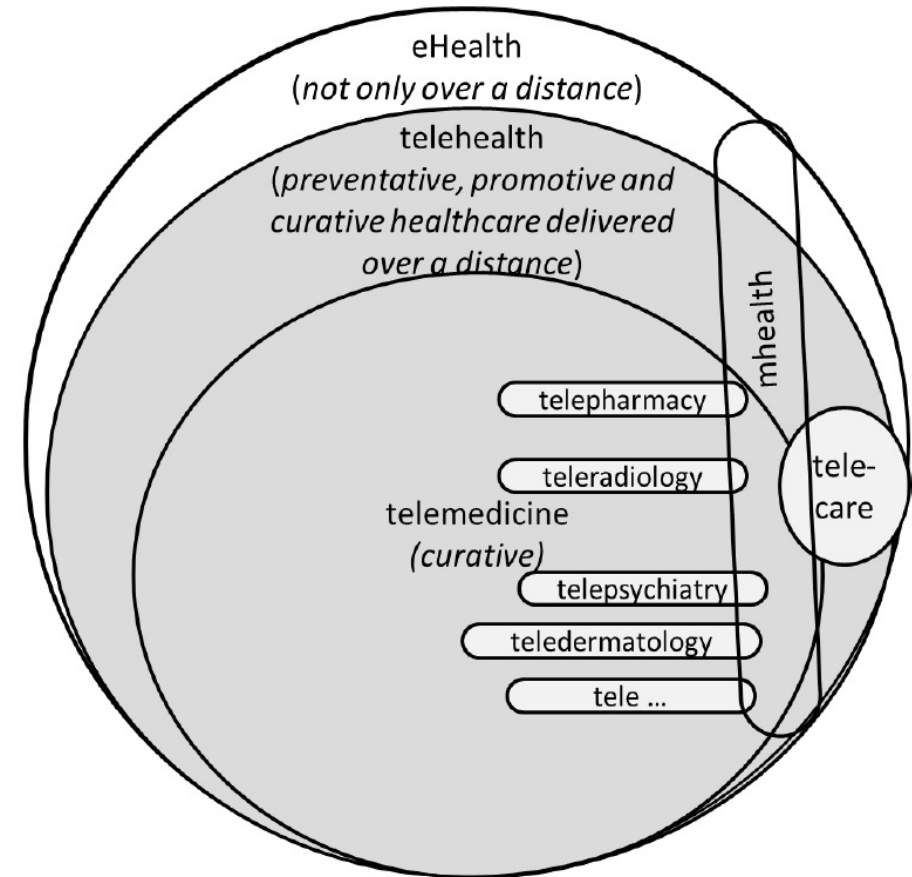
Telemedicine – provision of healthcare when distance and/or time separate(s) the participants and telecommunications technology is used

- Many refer to telemedicine in specific domains by using the prefix tele- with the specialty, e.g., teleradiology, teledermatology
- In general, telephone-only service not considered to be telemedicine

Telehealth – any health interactions using telecommunications

More information

- Textbook (Latifi, 2021)
- General perspective (Greene, 2022)
- [US federal Web site](#)



(Van Dyk, 2014)

Notion of telemedicine not new (Novak, 2012; Sommer, 2018)



Classification of telemedicine (Daniel, 2015)

Type of Telemedicine	Description	Example
Asynchronous	Transmits a patient's medical information not used in real time*	The radiographs of a patient's broken wrist are sent off site to an orthopedist for evaluation as to whether the patient needs surgery
Synchronous	Real-time interactive technologies, such as 2-way interactive video	A physician sets aside 2 h each weeknight for e-visits in which patients can connect with the physician through a Webcam and be "seen" for acute health conditions from their homes A rural community with no primary care physicians connects patients at a community health center through a 2-way video with physicians at a remote location
Remote patient monitoring	A patient's health information is gathered through technological devices and sent for evaluation and stored in the patient's medical record for future use	A patient with hypertension changes medication and uses a monitoring device to measure blood pressure over the course of a week. The information is transferred to the patient's physician, who determines whether the patient needs to come to the office for follow-up
Mobile health care services	Uses mobile technology, such as smartphone applications and text messages, to manage and track health conditions or promote healthy behaviors	A primary care practice uses text messages to confirm appointments with patients

* "Store and forward."

Examples of telemedicine



Synchronous

Source: Healthcare IT News



Asynchronous

Source: Sacred Health Hospital, Pensacola, FL



Remote patient monitoring

Source: Care Innovations

Additional uses of telemedicine and telehealth

Direct-to-consumer telehealth – patient interact directly with a physician, not necessarily their primary care or other established physician

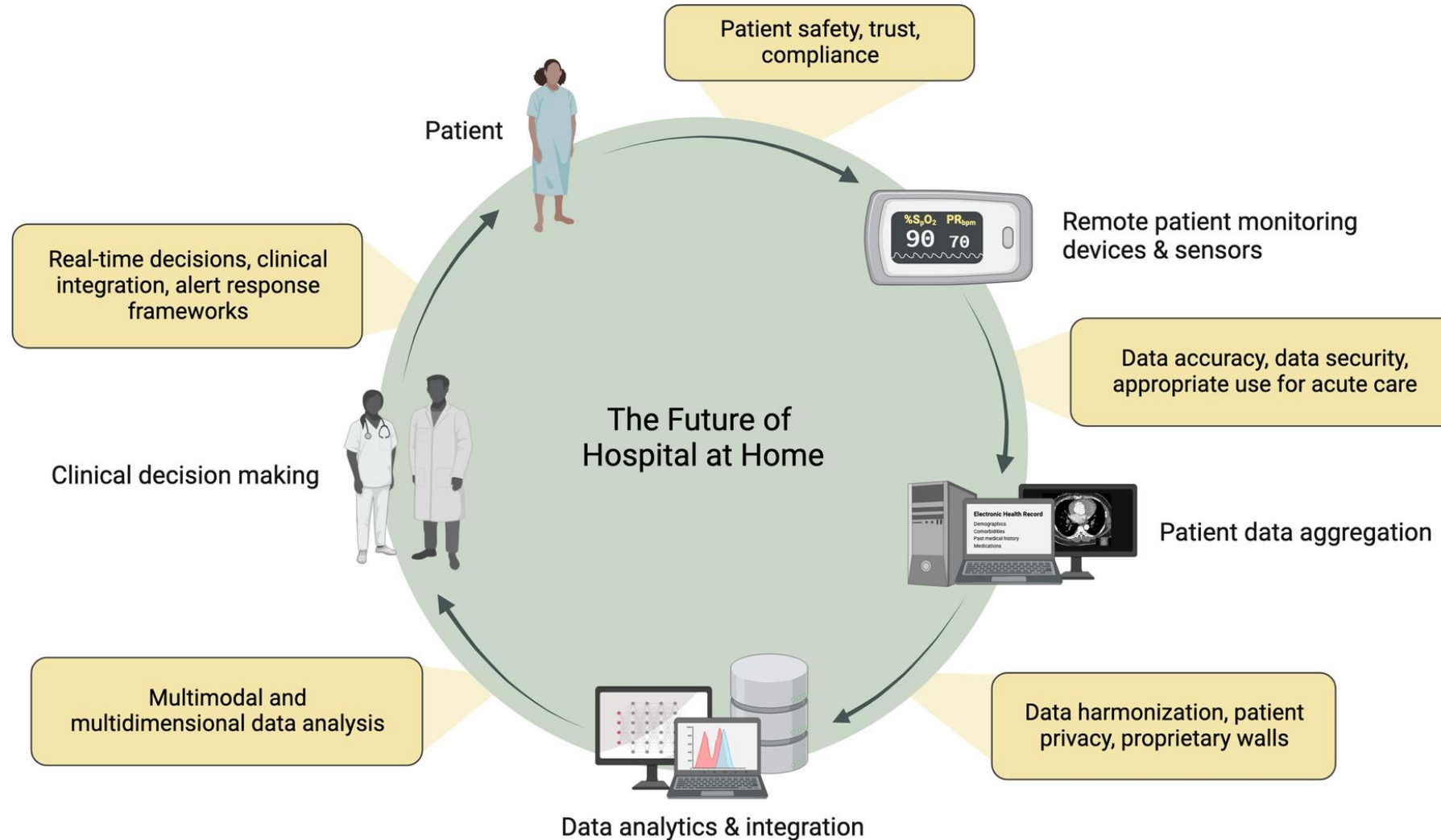
- Companies offering services, e.g.,
 - [Teladoc](#)
 - [Remedy Telehealth](#)
 - [HealthTap](#)

Video visits – growing number of health systems offering physician appointments via videoconferencing and other modalities, e.g.,

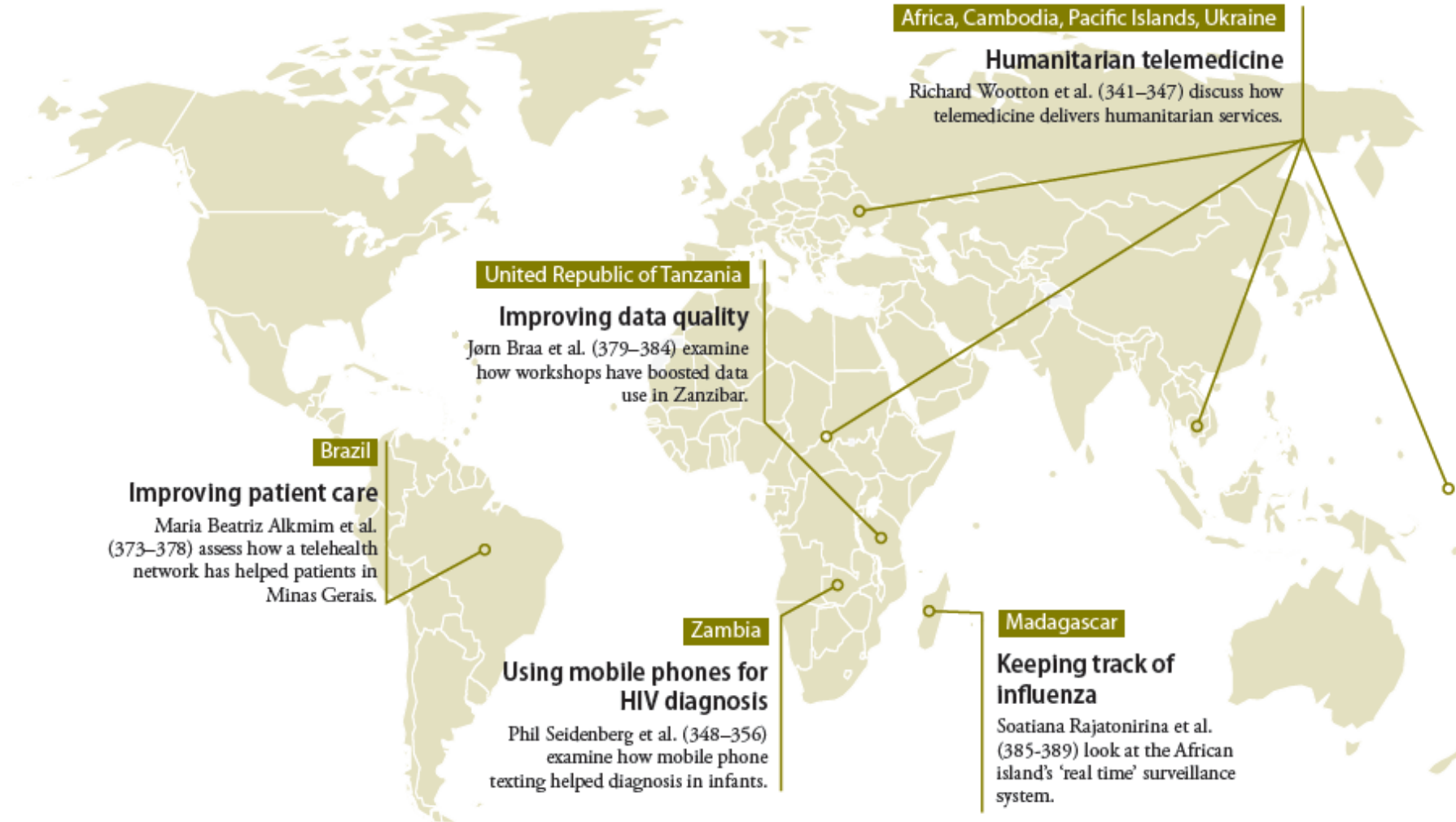
- [OHSU](#)
- Kaiser-Permanente (Reed, 2018)

Remote primary care inpatient consults (Kazberouk, 2023)

Hospital at home (Pandit, 2024)



Another role for telemedicine/eHealth is in developing world (Wooton, 2012)



Usage – before and after COVID-19

Prior to COVID-19, moderate availability and niche use

- Systematic review from 2006 found very small niche use (Hersh, 2006)
- Evidence base prior to COVID-19 (Totten, 2020)

In 2018, accounted for 2.4% of all healthcare claims (encounters) (Rae, 2020)

Hospitals use (Jain, 2020)

- Any use – 47.6%
- Intensive care unit – 26.8%

Physician use (Kane, 2018)

- Physician-to-patient – 15.4% overall, highest among radiology, psychiatry, pathology
- Physician-to-physician – 11.2% overall, highest in pathology, emergency medicine, radiology

US federal response early in pandemic

CMS – Section 1135 Waiver expanded telehealth services to allow (and has continued during public health emergency)

- Service to Medicare beneficiaries regardless of patient location – including at the patient's home
- Consultation via telephone without the requirement of video conferencing
- Service to patients with whom the provider does not have a pre-existing relationship
- Treatment by a physician or health care professional in another state so long as they have an equivalent license from another state and subject to any state law requirements that may apply
- Application to any service without regard to the treatment or diagnosis of the patient, not just for COVID-19

HIPAA – Covered health care providers may provide telehealth services by utilizing popular video chat applications including Apple FaceTime, Facebook Messenger video chat, Zoom, or Skype to provide telehealth services

COVID-19 related waivers allowed for expansion of Medicare FFS telehealth services (Samson, 2020)

Urban areas – previously only rural beneficiaries could receive telehealth services

In patient's home – previously beneficiaries had to go to a healthcare facility for the telehealth visit

For 140 additional healthcare services

For additional types of providers, allowed to serve as distant site providers, including federally qualified health centers (FQHCs) and rural health clinics (RHCs)

Through audio-only interactions for some services; and with reduced or waived cost-sharing

63-fold increase in use during pandemic for Medicare beneficiaries (Samson, 2021)

Figure 1. Telehealth as % of Medicare FFS Part B Visits by Visit Specialty, 2019 and 2020

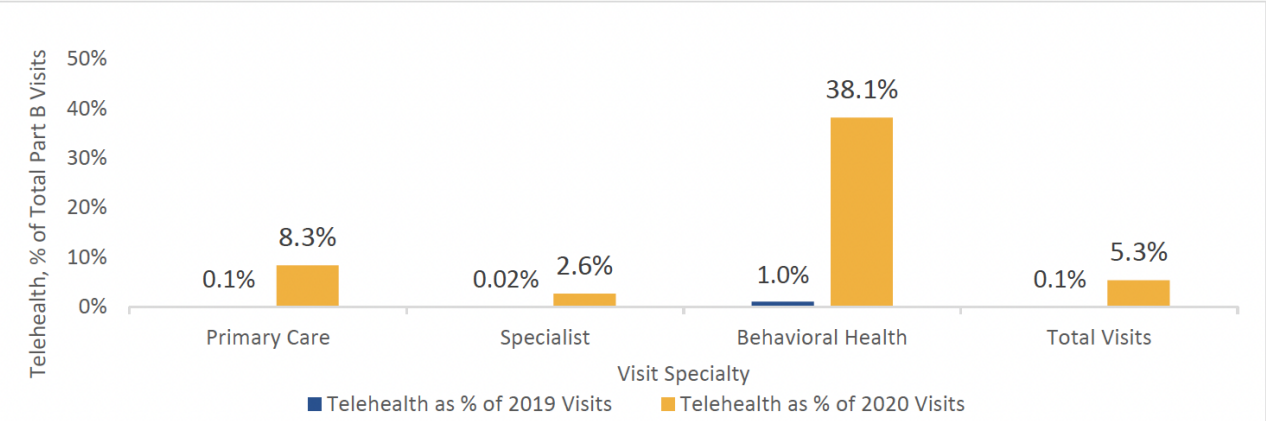


Figure 4. Behavioral Health Specialty Care Medicare FFS Part B Visits per Week in 2020 - Telehealth versus In-Person

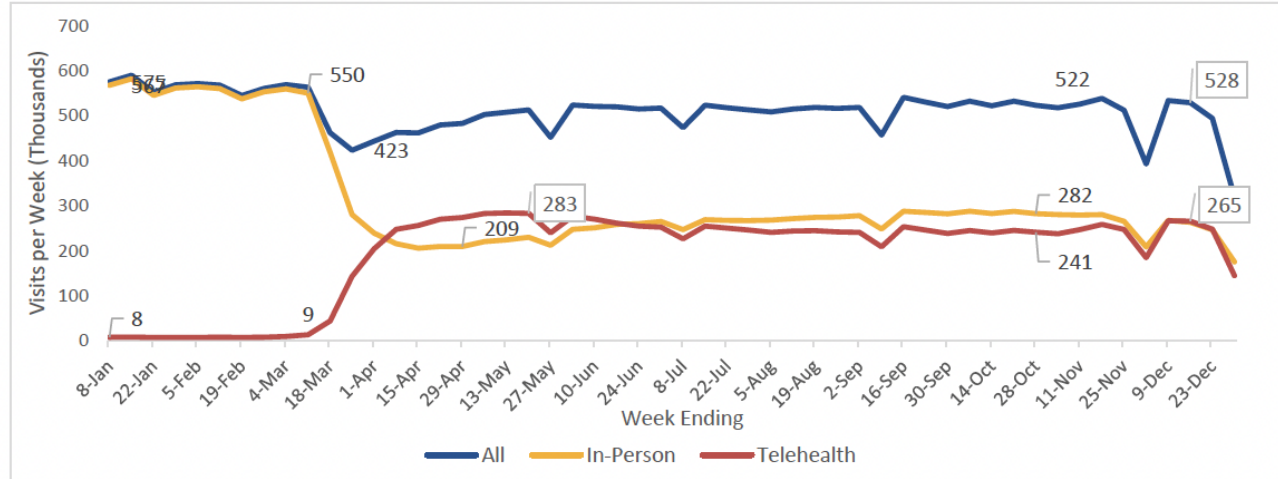


Figure 2. Primary Care Medicare FFS Part B Visits per Week in 2020 - Telehealth versus In-Person

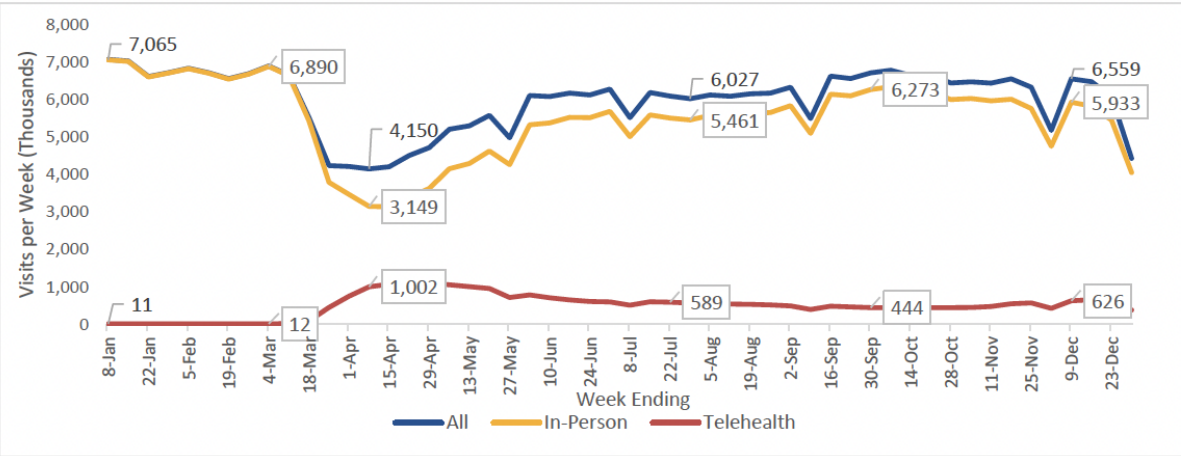
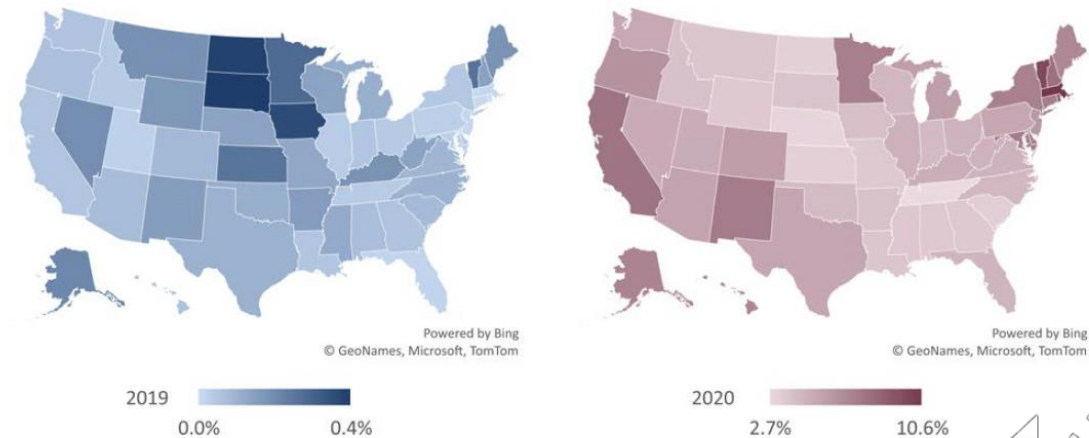


Figure 6. Medicare FFS Telehealth Use by State, 2019 and 2020, % of Total Medicare FFS Part B Visits



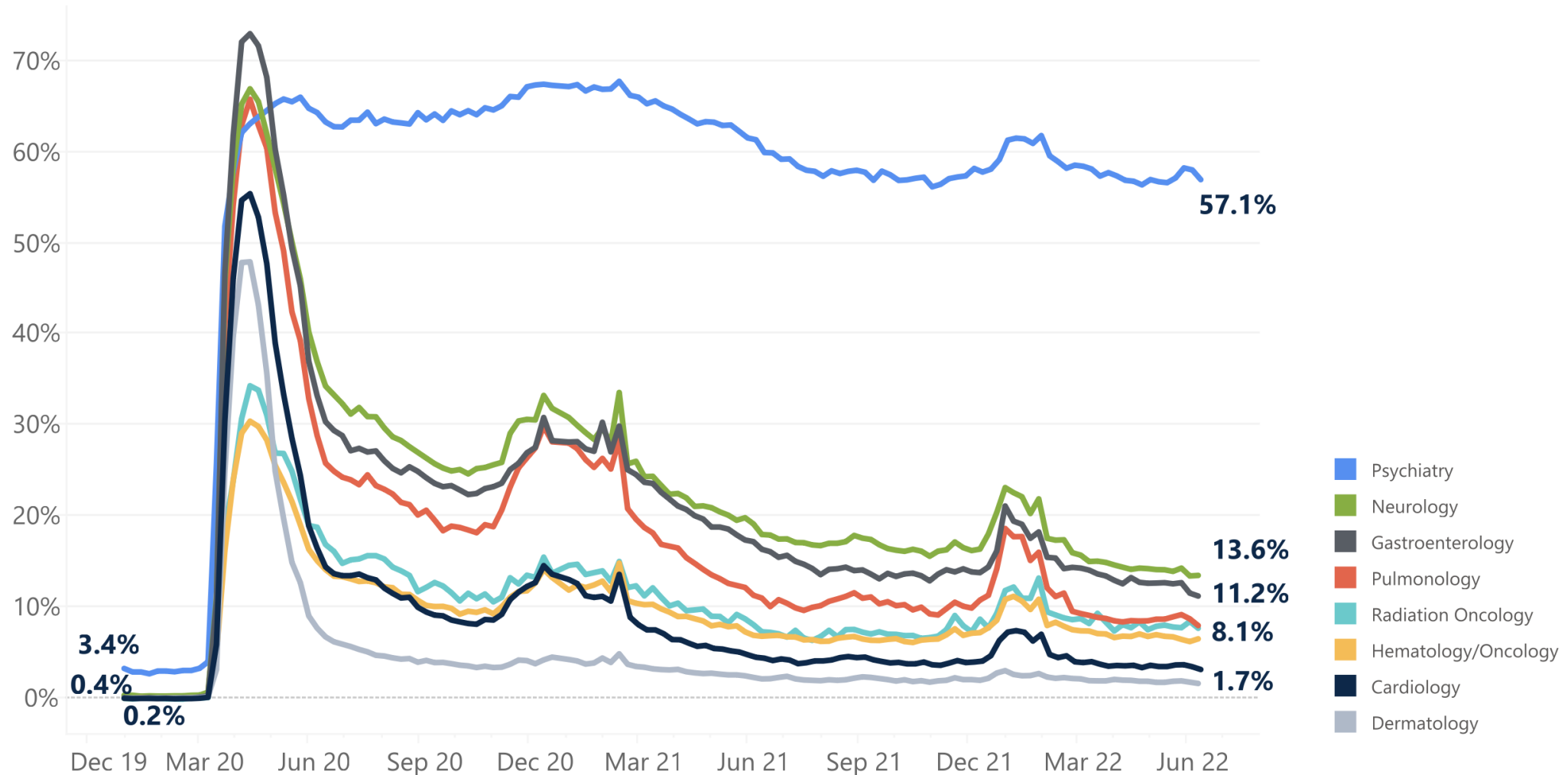
Use of telemedicine by office-based physicians in 2021 (Pylypchuk, 2023)

ONC report from National Electronic Health Record Survey (NEHRS), National Center for Health Statistics (NCHS), CDC

Any use of telemedicine by office-based physicians increased from 15% in 2018-2019 to 87% in 2021 – other findings included

- Lower use by self-employed physicians
- Higher use by physicians participating in alternative payment models
- Most common barrier patient difficulties using tools – reported by 70% of physicians
- 62% of physicians fully or mostly satisfied with use; 80% plan to continue after pandemic

As pandemic receded, usage leveled off, but to new higher baseline (Anderson, 2022)



Telemedicine usage post-COVID-19

AMA survey of physicians in 2022 found 2-4 fold increases, now with (Kane, 2023)

- 74.8% in practices with telemedicine capabilities
- 66.3% with ability to use videoconferencing
- 21.5% able to do remote patient monitoring

Analysis of outpatient visits at VA (Ferguson, 2024)

