MEDINFO23

8 – 12 JULY 2023 | SYDNEY, AUSTRALIA

Adoption of digital health technologies by nurses during the COVID-19 pandemic: An international collaboration

Panel Discussion

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AIDH IMIA

Welcome by Facilitator: **Michelle HONEY**

Overview **Dawn DOWDING**

Zerina LOKMIC-TOMKINS - Australia

Laura-Maria PELTONEN - Finland

Emma COLLINS – New Zealand

Dawn DOWDING – United Kingdom

Hwayoung CHO - USA

Project Overview

- Use of digital technologies are an integral component of patient care
- Adoption of digital technologies was accelerated during the COVID-19 pandemic
- Nurses are key for the successful deployment and use of digital technologies

Background

UK funding from the Burdett Trust for Nursing to:

- identify **what** digital technologies have been introduced into acute, primary care and community social care organisations in the UK during the COVID-19 crisis that are led and implemented by nurses to support patient care delivery.
- **explore** what are the similarities and differences in digital technologies introduced across organisations.

Methods

- Online survey to identify characteristics/types of technology adopted during pandemic
- In-depth interviews with sample of nurses to explore issues and experiences in more detail

Survey Tool

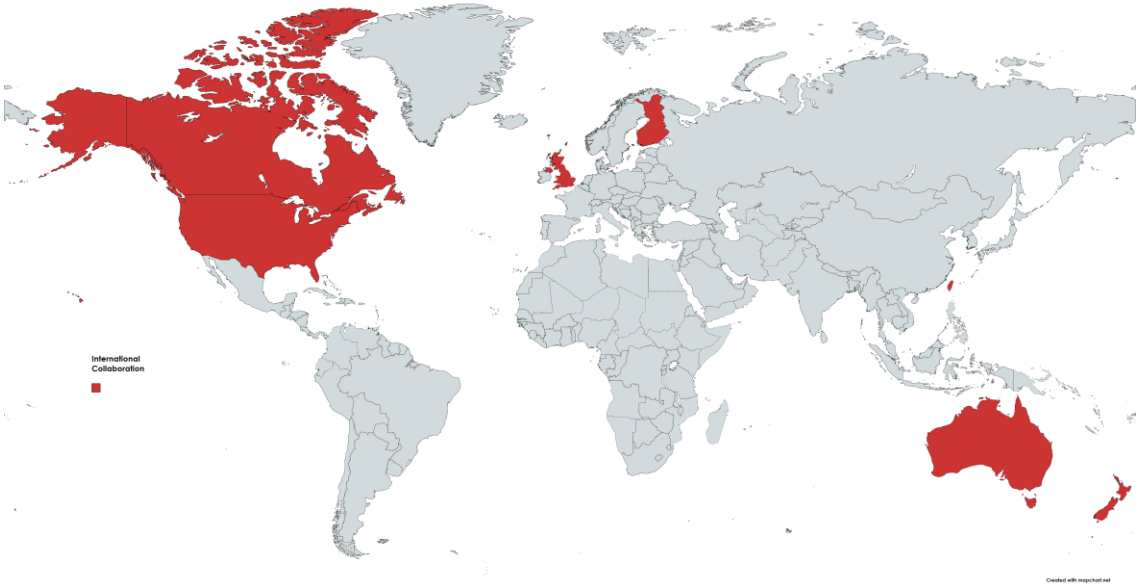
- 41 questions – demographics, details of digital technologies adopted during the pandemic (up to 3), nurses broader attitudes to healthcare technology

- Questions based on the Non-adoption, abandonment, scale-up, spread, sustainability (NASSS) framework

International Study

- Following interest via Twitter on our study
  - Established international collaboration of nurses worldwide
  - Provided a copy of the survey questions to all participants
  - Each country has responsibility for ethical/governance approvals for survey distribution
  - Collection of data, analysis and reporting for each country
  - PLAN: to combine data from across participating countries to provide international comparison of nurses' experiences

Participants so far....



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Australia's Nursing Workforce (2021/2023)

All nurses

469,986 nurses (including those also registered as midwives)

- Up **2.5%** from 2020/21
- **55.1%** of all registered health practitioners
- **28,095** also hold registration in midwifery

1.4% identified as Aboriginal and/or Torres Strait Islander

88.3% female; **11.7%** male

Nurse-only registered

441,891 nurses

- Up **2.9%** from 2020/21
- **51.8%** of all registered health practitioners

87.7% female; **12.3%** male

Age

All nurses, including those also registered as midwives

<25	25–34	35–44	45–54	55–64	65–74	>75
6.4%	25.9%	22.7%	19.3%	18.5%	6.8%	0.4%

Divisions, dual registration and endorsements

Nurses by division	
74,100	enrolled nurses
10,970	enrolled nurses and registered nurses
356,821	registered nurses
441,891	**total**

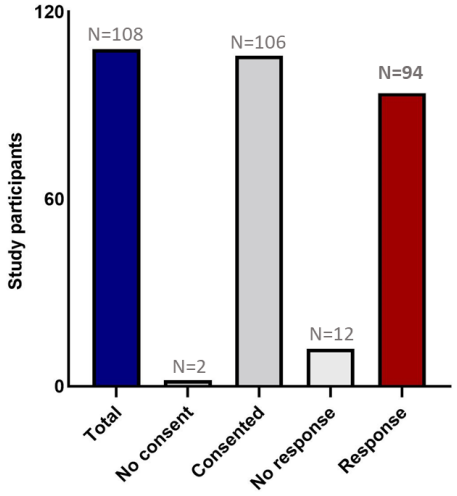
Nurses and midwives, dual registered	
113	enrolled nurses and midwives
97	enrolled nurses and registered nurses and midwives
27,885	registered nurses and midwives
28,095	**total**

Nurses with endorsements	
2,425	nurse practitioners
1,299	scheduled medicines (rural and isolated practice)
3,724	**total**

Source: https://www.nursingmidwiferyboard.gov.au/News/Annual-report.aspx

Australia

A



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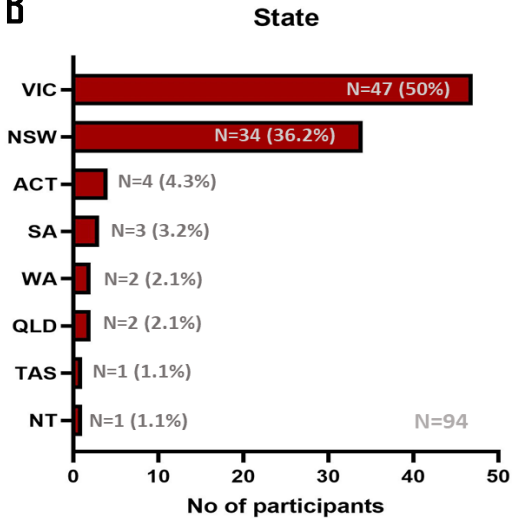

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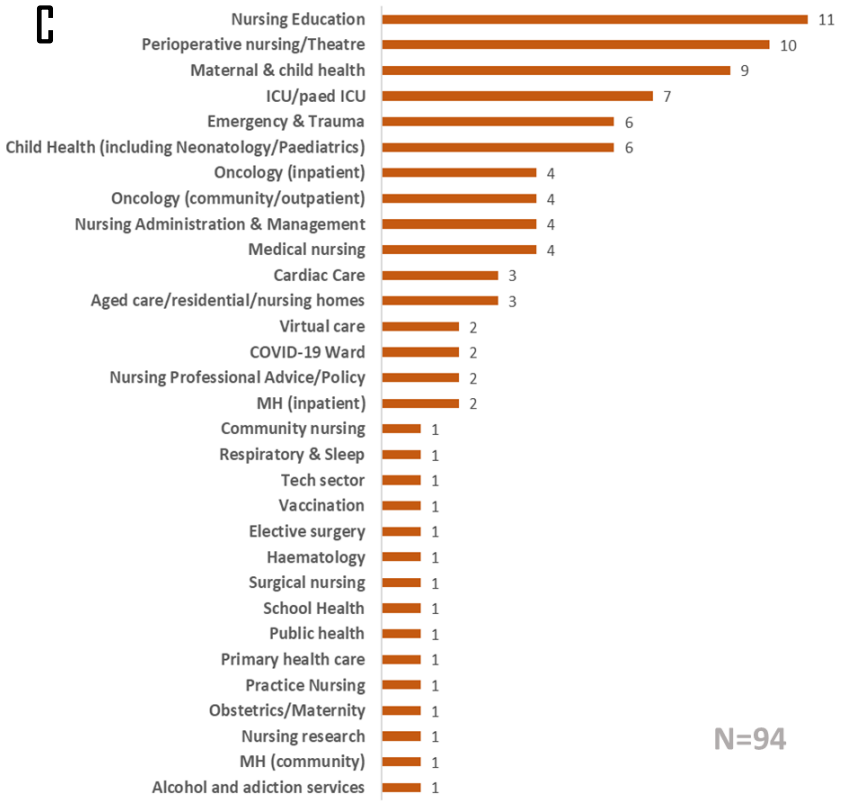
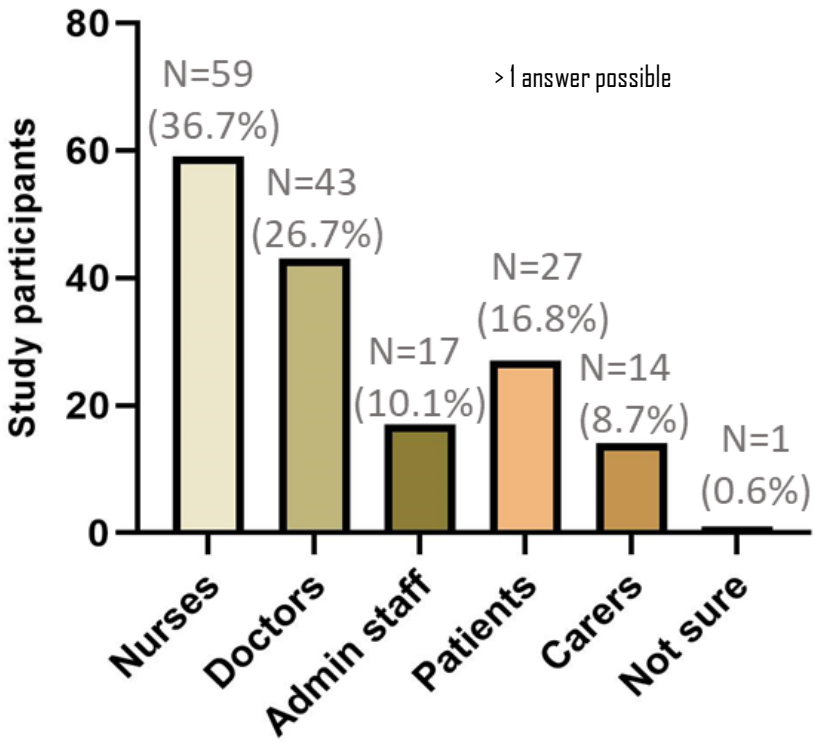
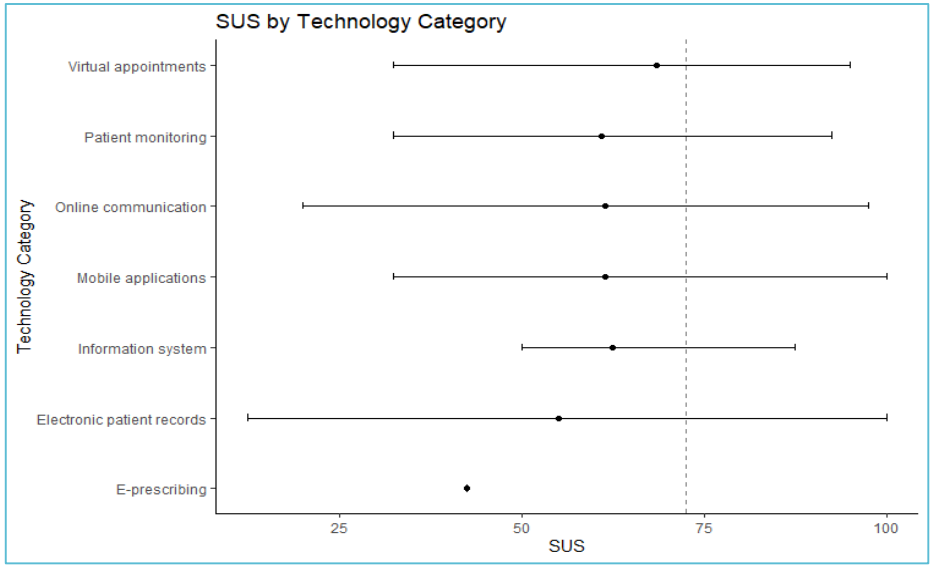


Australia

Type of technology (main function)	N (%)
E-prescribing	1 (0.98)
Electronic patient records	15 (14.70)
Information system	3 (2.94%)
Mobile applications	5 (4.90)
Online communications	42 (41.18)
Patient monitoring	20 (19.61)
Virtual appointments	16 (15.69%)
Total	102

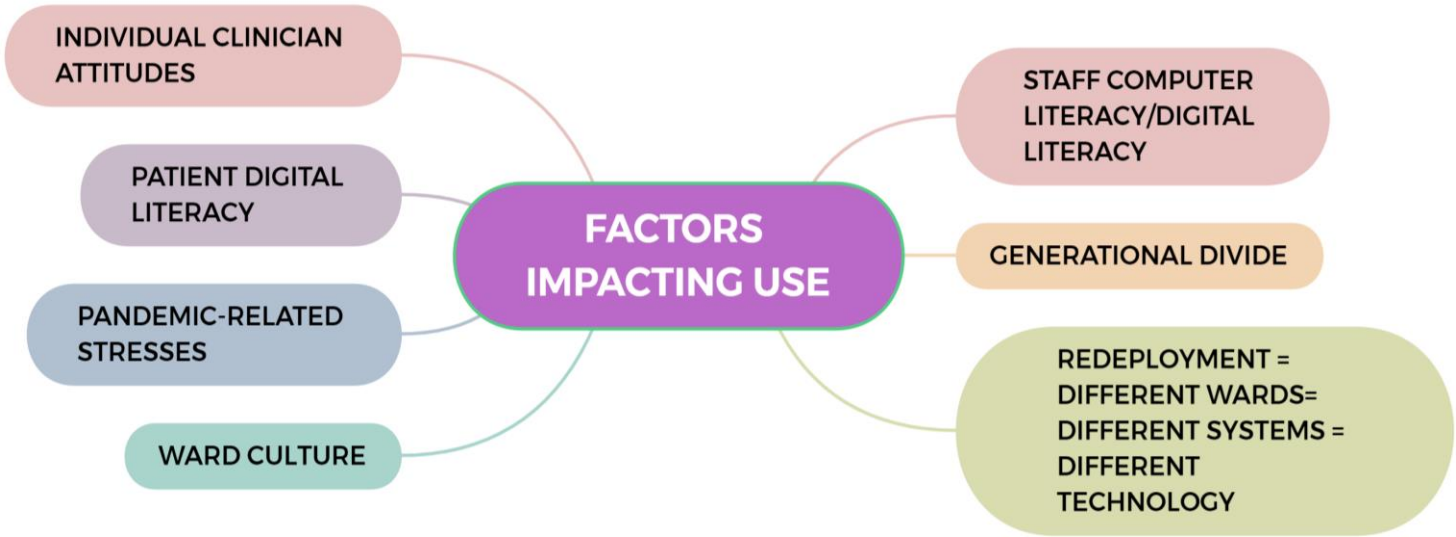


Australia



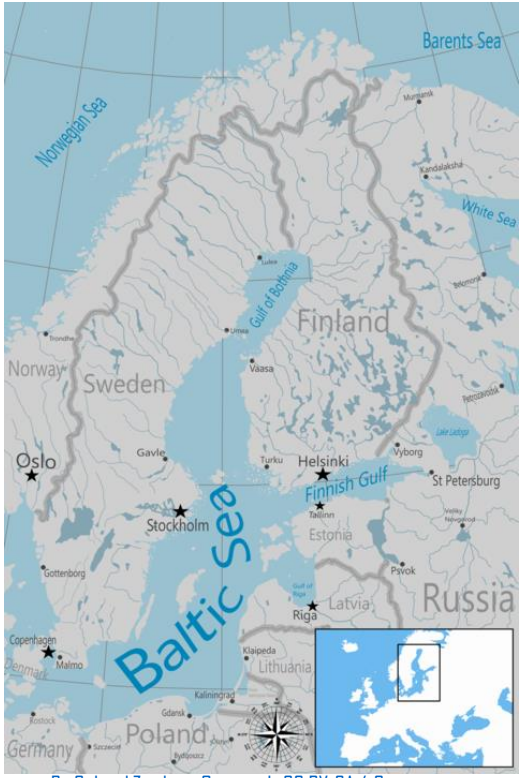
Type of Technology (main function)	SUS Score Range	Mean SUS score (SD)
E-Prescribing	42.5-42.5	0.0 (0.0)
Electronic patient records	12.5-100.0	55.0 (20.8)
Information system	50.0-87.4	62.5 (21.7)
Mobile applications	32.5-100.0	61.5 (32.0)
Online communication	20.0-97.5	61.5 (18.2)
Patient monitoring	32.5-92.5	60.9 (15.7)
Virtual appointments	32.5-95.0	68.4 (15.6)

Australia


INDIVIDUAL CLINICIAN ATTITUDES
PATIENT DIGITAL LITERACY
PANDEMIC-RELATED STRESSES
WARD CULTURE
FACTORS IMPACTING USE
STAFF COMPUTER LITERACY/DIGITAL LITERACY
GENERATIONAL DIVIDE
REDEPLOYMENT = DIFFERENT WARDS= DIFFERENT SYSTEMS = DIFFERENT TECHNOLOGY

Finland

- Population: 5.5 million
- Area: 338,455 km^2
- Universal health coverage
- Publicly funded healthcare system
- Healthcare expenditure: 9% of GDP
- Life expectancy: 82.1 years
- Infant mortality rate: 1.4 deaths per 1,000 live births
- Hospital beds: 4.6 per 1,000
- Healthcare employment: 125,000 nurses and 23,500 physicians



By Gabriel Ziegler - Own work, CC BY-SA 4.0,

Finland

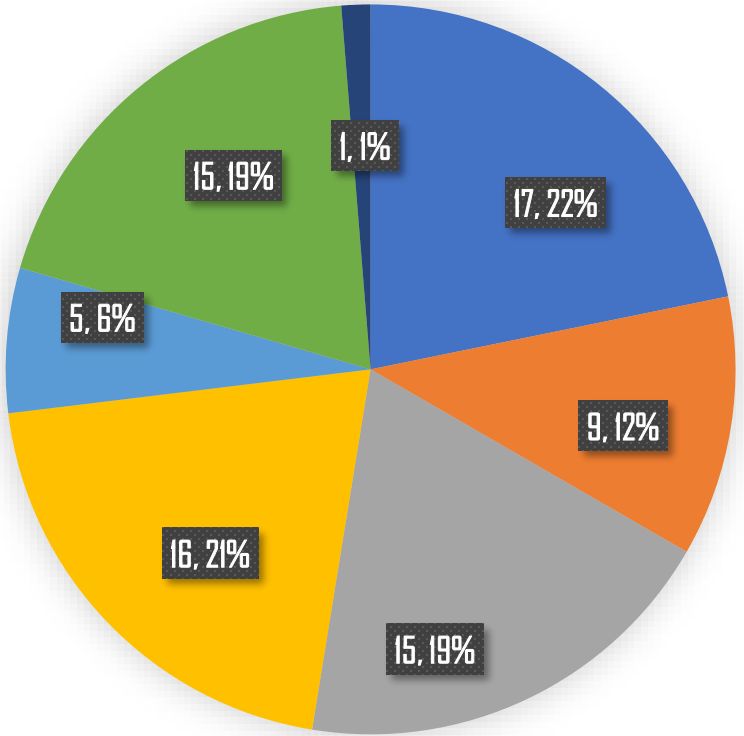
n=55

Characteristics		No.	%
Setting	Primary care	14	25.9
	Specialised care	35	64.8
	Private sector	5	9.3
Role	Nurse	33	60.0
	Leadership (15 to 120 people)	13	23.6
	Advanced practice	8	14.6
	Other	1	1.8
Designated entity for implementation of digital technologies in nursing	Yes	35	64.8
	No	7	13.0
	I don't know	12	22.2

Finland

Type of technology (n=78)

- Clinical monitoring system
- Clinical information system
- Communication platform for professionals
- Digital care platform
- Management information system
- Video conferencing platform
- Not specified



Finland

Type of technology (main function)	SUS Score range	Mean SUS
Clinical information system	70-90	79.17 (SD 7.81)
Clinical monitoring system	62.5-97.5	76.47 (SD 7.72)
Communication platform for professionals	67.5-92.5	76.00 (SD 6.53)
Digital care platform	60-80	71.56 (SD 5.62)
Management information system	70-85	76.00 (SD 5.76)
Video conferencing platform	65-87.5	77.67 (SD 6.97)

Finland

Factors that influenced use

- Lack of training, space and time to use the technology
- Culture and attitudes related to the technology
- Complexity of the technology
- Trust in the technology
- Technical problems when using the technology

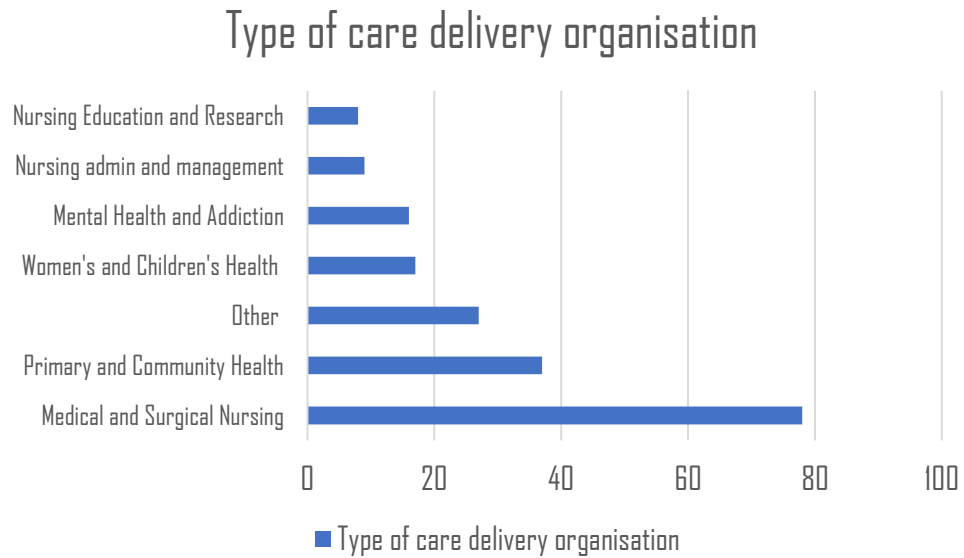
New Zealand

- Spread over two main islands in South Pacific
- Population 5.12 million
- Nationally delivered public health care system
- NZ covid response was to 'stamp it out'
- A series of high to low degree lockdowns

New Zealand Registered Nurses

- 56,000 nurses in NZ
- 187 respondents (0.33% response rate)
- nurses from across New Zealand
- from a wide range of practice areas

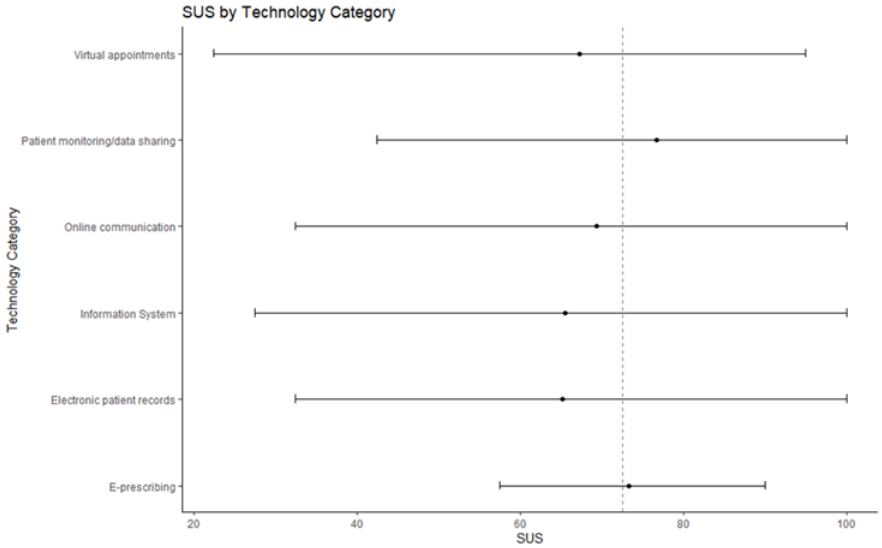
New Zealand



Type of Technology	n (%)
Online communication	48 (29.5)
Electronic patient records	41 (25.2)
Patient monitoring/data sharing	40 (24.5)
Information systems	14 (8.6)
Virtual appointments	12 (7.4)
E-Prescribing	8 (4.9)
Total	163 (100)

New Zealand SUS score

Type of Technology	Range	Mean SUS score (SD)
Patient monitoring/data sharing	42.5-100.0	76.7 (16.0)
E-Prescribing	57.5-90.0	73.3 (15.1)
Online communication	32.5-100.0	69.4 (16.4)
Virtual appointments	22.5-95.0	67.3 (21.2)
Information System	27.5-100.0	65.5 (21.2)
Electronic patient records	32.5-100.0	65.2 (20.9)



New Zealand

Factors arising from this study

- Training is needed for staff to fully utilise technology
- All staff need a standard base level of digital literacy
- Support for digitisation in healthcare needs to supported by the healthcare institution and infrastructure
- Staff need time to develop confidence and competence
- The patients experience needs to be explored

UK

- Nurses in the UK working in any health or social care setting
- Link to survey sent to nursing networks and social media sites
- Recruitment over a 5 week period October-November 2021

UK

Type of care delivery organisation	No response to any technology (n=80)	Respond to at least 1 technology (n-55)	Total (n=135)
NHS/HSC Acute Trust	41 (51.3)	38 (69.1)	79 (58.5)
NHS/HSC Ambulance Trust	2 (2.5)	0 (0.0)	2 (1.5)
NHS/HSC Community Care Organisation	9 (11.3)	1 (1.8)	10 (7.4)
NHS/HSC Mental Health Trust	3 (3.0)	1 (1.8)	4 (3.0)
Specialist provider (e.g. ophthalmology)	1 (3.0)	3 (5.5)	4 (3.0)
GP Practice/Primary Care Provider	6 (7.5)	4 (7.3)	10 (7.4)
Clinical Commissioning Group	1 (1.3)	0 (0.0)	1 (0.7)
Other	4 (5.0)	8 (14.6)	12 (8.9)
Missing	13 (16.3)	0 (0.0)	13 (9.6)

UK

Table 1: Technology Types

Type of Technology (main function)	N (%)
E-prescribing	3 (3.5)
Electronic patient records	5 (5.9%)
Online communication	22 (25.9%)
PPE*	1 (1.2)
Patient monitoring/data sharing	39 (45.9)
Virtual appointments	15 (17.6)
Total	**85 (100)**

*Identified by respondent as a technology to support PPE distribution

UK

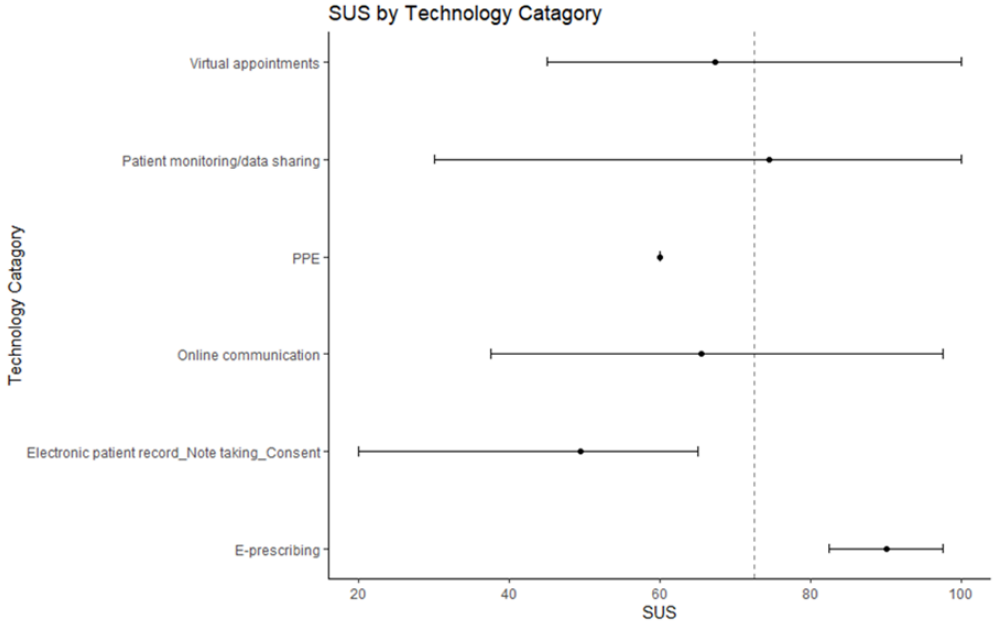


Table 3: SUS scores by technology type

Type of Technology (main function)	Range	Mean SUS score (SD)
E-prescribing	82.5-97.5	90 (10.6)
Electronic patient records	20-65	49.4 (20.2)
Online communication	37.5-97.5	65.5 (17.6)
PPE	-	60
Patient monitoring/data sharing	30-100	74.5 (19.5)
Virtual appointments	45-100	67.3 (18.6)

UK

Factors that impacted use

- Computer/digital literacy
- Access to network/availability of devices/connectivity issues
- Time pressures
- Training needs

United States of America (USA)

- 50 states, a federal district, 5 territories, and minor islands
- Nursing: the largest workforce in healthcare
- 2022 Nursing Workforce
  - Number of active RN: >5M (5,239,499)
  - Become younger (median: 46 years)/more educated (>70% holding a baccalaureate degree or higher)/more diverse with increased male and Hispanic/Latino
  - >1/4 of nurses plan to leave nursing over the next 5 years
  - COVID-19 pandemic: increased demand/income and workload

Smiley RA, Ruttinger C, Oliveira CM, Hudson LR, Allgeyer R, Reneau KA, et al. The 2020 National Nursing Workforce Survey. Journal of Nursing Regulation. 2021;12(1, Supplement):S1-S96.

USA

- Study purpose: to explore nurses' adoption and use of digital health technologies to deliver patient care during the COVID-19 pandemic in the US
- An anonymous online survey with RNs between September and December 2022
- Using the US State Boards of Nursing registry lists of the six states: Florida (FL), New York (NY), Nebraska (NE), Ohio (OH), Oregon (OR), and New Mexico (NM), sent an invitation email containing an online survey link
- 752 RNs eligible/consented to take part in the survey
  - 680 RNs currently working in 41 states (39.7% Ohio)

Characteristic (n=752)	n (%)
Care Setting	
Hospital	415 (57.0%)
Ambulatory clinics	102 (14.0%)
Nursing home	34 (4.6%)
Region of US	
Midwest	330 (43.9%)
West	160 (21.3%)
South	97 (12.9%)
Northeast	96 (12.8%)

USA

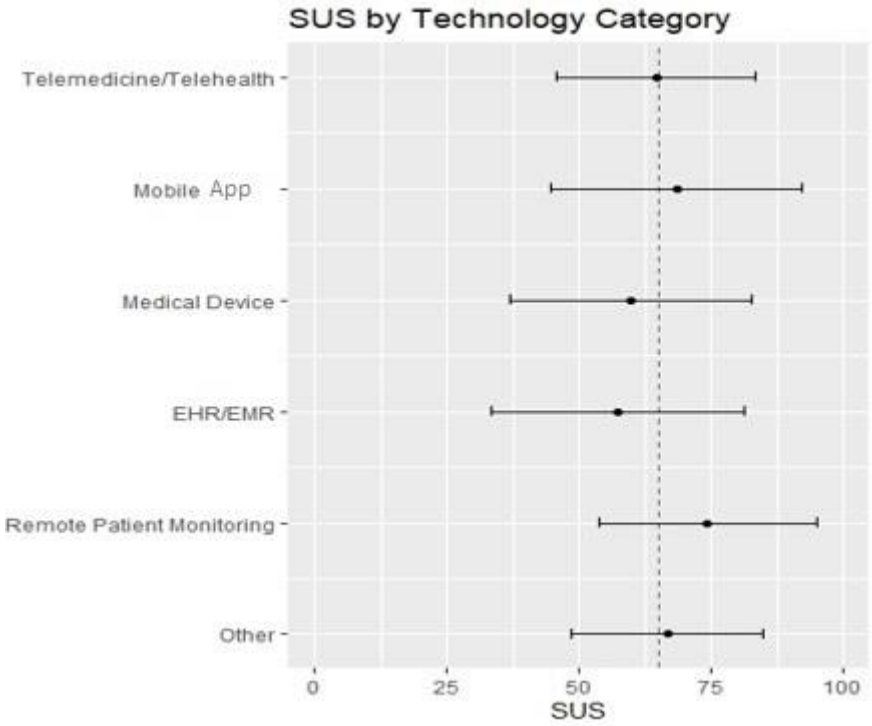
- 735 RNs: stand-alone systems (n=323, 43.9%), introduced into the organization during the pandemic (n=218, 29.7%), and nurses as main users of the technologies (n=673; 91.6%), followed by doctors (n=404; 55.0%) and patients (n=292; 39.7%)
- Main types of technologies used by RNs during the COVID-19 categorized by adapting the AHRQ Digital Healthcare Research Publications Database (n=648)

Type of technology	N (%)
Telehealth/Telemedicine	89 (13.73%)
Mobile Application	47 (7.25%)
Medical Device	45 (6.95%)
EHR/EMR	74 (11.42%)
Remote Patient Monitoring	282 (43.52%)
Other	111 (17.13%)
Total	**648**

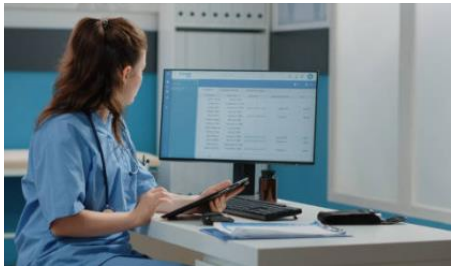
USA

- System Usability Scale (SUS) score

Type of technology	Range	Mean SUS score (SD)
Telehealth/Telemedicine	45.83-83.57	64.70 (18.87)
Mobile Application	44.78-92.24	68.51 (23.73)
Medical Device	37.01-82.57	59.79 (22.78)
EHR/EMR	33.47-81.23	57.35 (23.88)
Remote Patient Monitoring	53.77-95.05	74.41 (20.64)
Other	48.67-84.81	66.74 (18.07)



USA



- Factors that impact nurses' technology use
  - Level of technology (computer) literacy
  - Comfort level (e.g., level of experience)/attitude of physician
  - Staff orientation/training
  - Persistent system-related problems (e.g., crash)
  - Internet speed (e.g., poor service in rural area)
  - System flexibility/use interface/ease of adaption (e.g., narrative/customized to specific pt)
  - Equipment support (e.g., computer and software)
  - Unfamiliar system for temp agency staff (travel nurse)
  - Time consuming - Less time with patients/Poor nursing care

Discussion

We welcome comments from the audience

Closing Remarks

If you would like to join the collaboration please email:

dawn.dowding@manchester.ac.uk

Join us next year at NI2024