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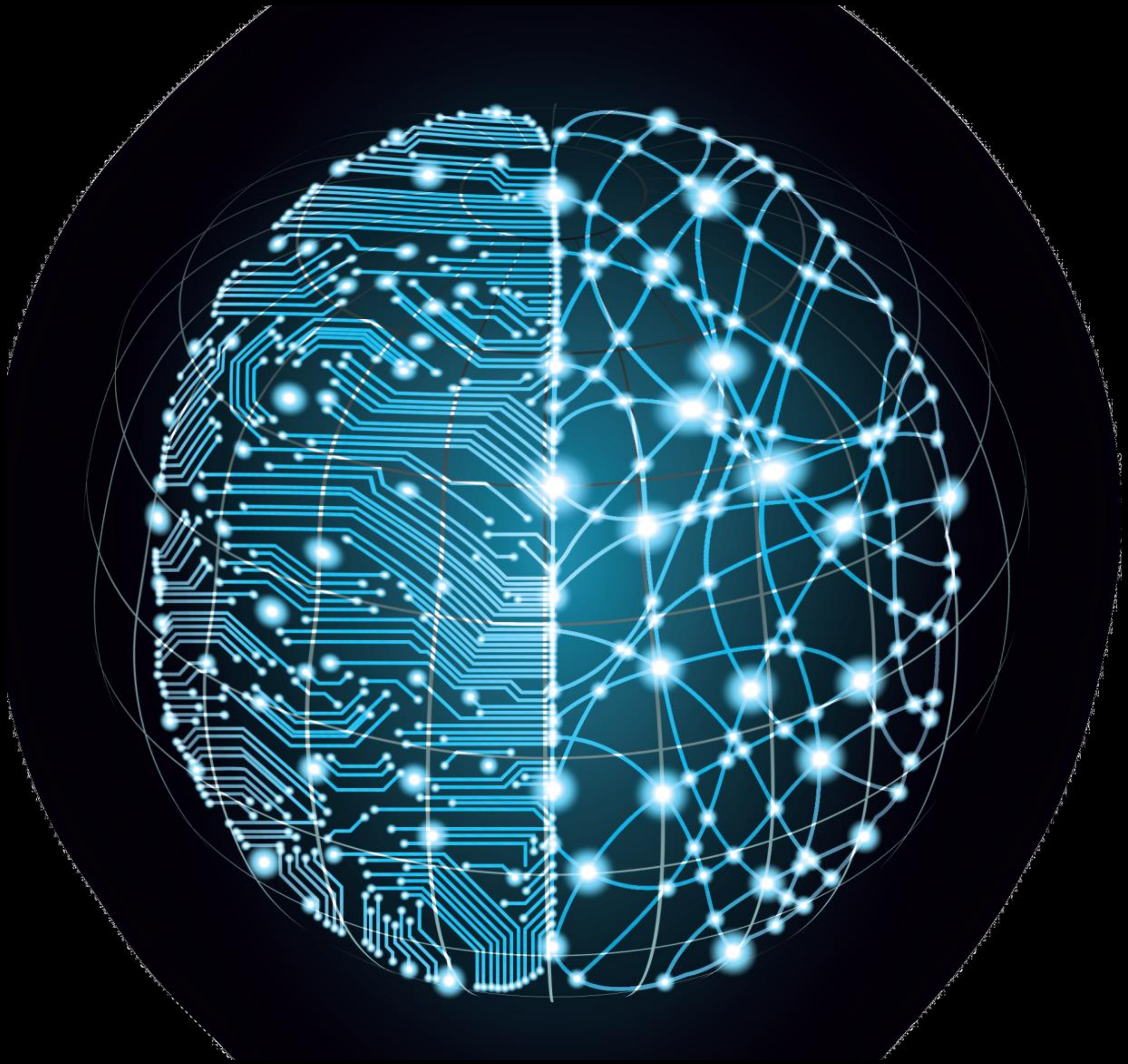


The future of healthcare: Driving Innovation in health care

Karen Taylor and Francesca Properzi

November 2019

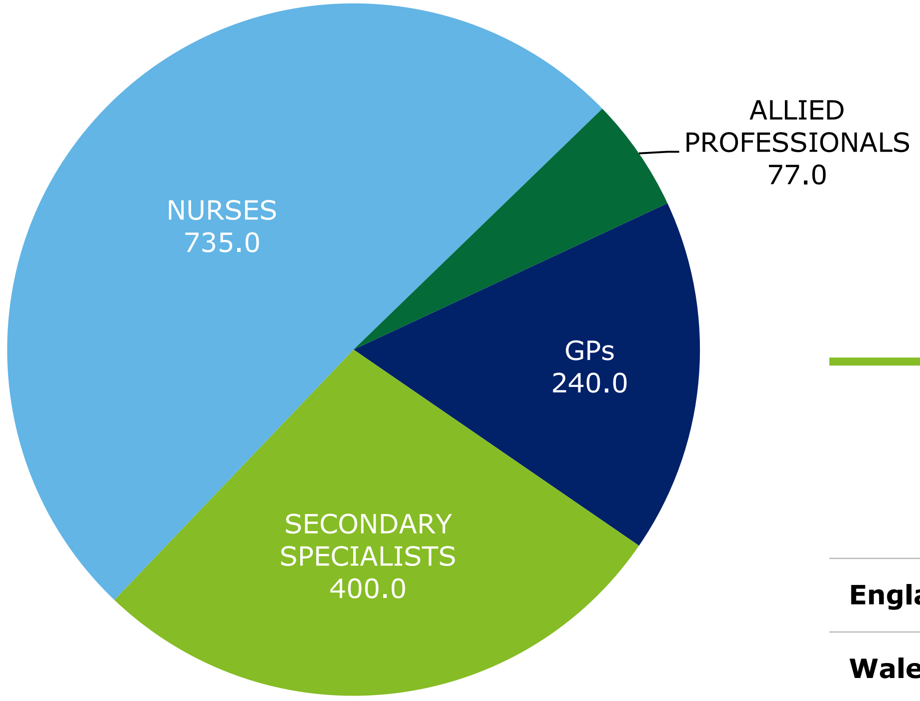
The SCOPE OF AND METHODOLOGY FOR THE REPORT

- Our research provides an assessment of the current challenges and opportunities for, and future potential of, digital healthcare across the UK; including identifying evidence-based good practice examples.
- Context the NHS Long Term Plan and need to adopt digital solutions at scale
- Our 2018 report, Time to care: Securing a future for the hospital workforce in the UK highlighted the importance of digital technology to bridge the gap between demand and supply.
- We surveyed 1,500 healthcare professionals working across primary, community and secondary care across the four UK countries.
- We interviewed 65 stakeholders, including policy makers, IT vendors, SMEs (technology solution providers), CCIOs, CIOs, academics, board level executives and patient advocacy groups.

‘SHAPING THE FUTURE OF DIGITAL HEALTH’ SURVEY

UK clinical workforce

STRATIFICATION



1500 UK CLINICIANS IN TOTAL

	Primary Care Doctors	Secondary Care Specialists	Allied Health Professionals	Nurses	Total
England	204	400	67	636	1307
Wales	8	13	2	31	54
Scotland	17	34	7	54 (19)	112
N. Ireland	11	5	1	14	31
UK Total	**240**	**452**	**77**	**735 (260)**	**1504**

A Digitally Enabled NHS – Key Objectives

A **'digital first' option** will be offered to ensure that patients have **straightforward digital access to NHS services** and that clinicians can access and interact with patient records and care plans wherever they are.

The **NHS App will create a standard online way for people to access the NHS**. The app will work seamlessly with other services at national and local levels and, where appropriate, be integrated into patient pathways.

Decision support and artificial intelligence will be used to help clinicians in **applying best practice**, eliminate unwarranted variation across pathways of care, and support patients in managing their health and condition.

All providers, across acute, community and mental health settings, will be expected to **advance to a core level of digitisation by 2024.**

Clinical, genomic and other **data will be linked to support the development of new treatments** to improve the NHS, making data captured for care available for clinical research, and publish, as open data, aggregate metrics about NHS performance and services.

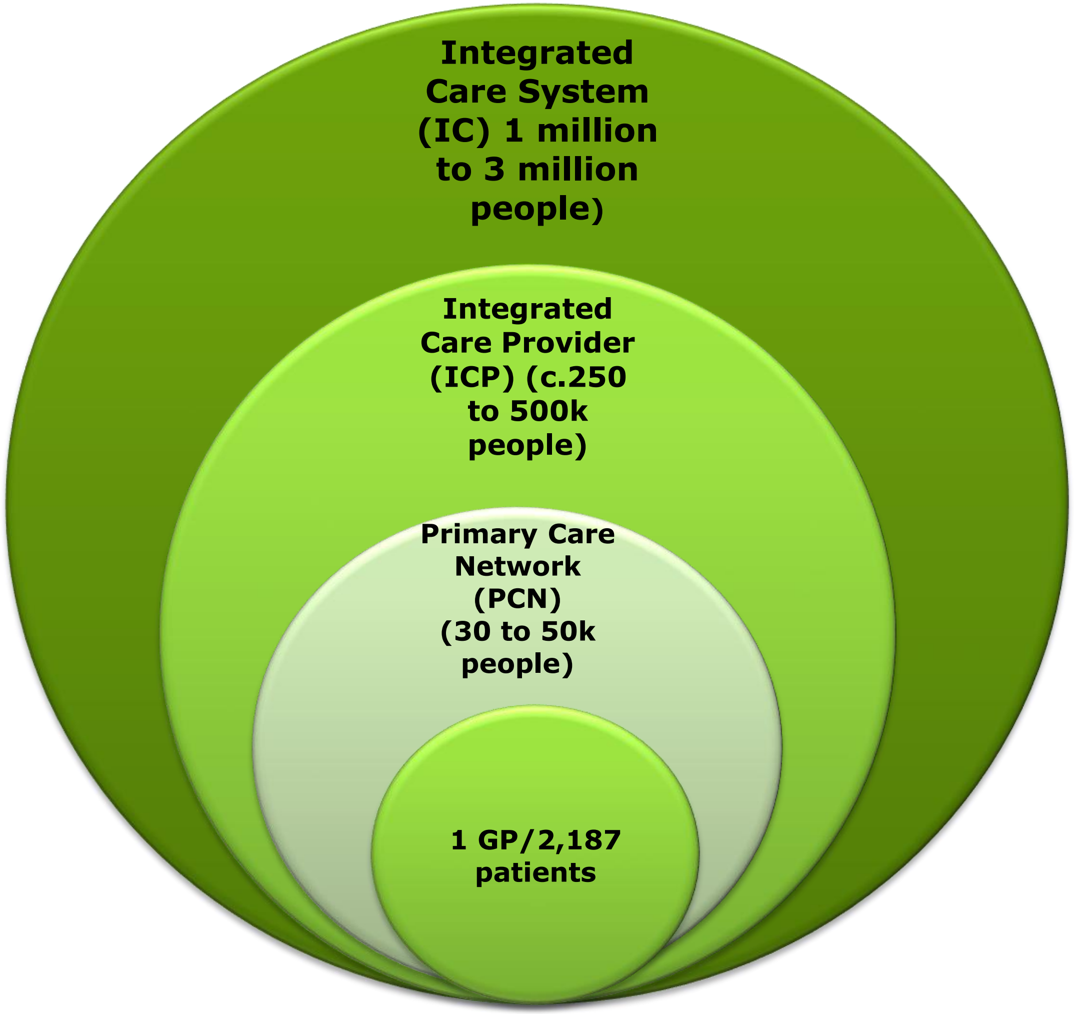
In 2021/22, there will be systems that **support population health management in every Integrated Care System across England**, with a Chief Clinical Information Officer (CCIO) or Chief Information Officer (CIO) on the board of every local NHS organisation.

Rationale for transforming primary care and creating integrated care systems

Primary care is at the cornerstone of a sustainable health system. The NHS relies on it to survive and thrive.

General practice is the focal point of primary care; responsible for the health of its registered list of patients, including maintaining each patient's primary medical record.

"There is arguably no more important job in modern Britain than that of the family doctor." Simon Stevens, Chief Executive NHS England.



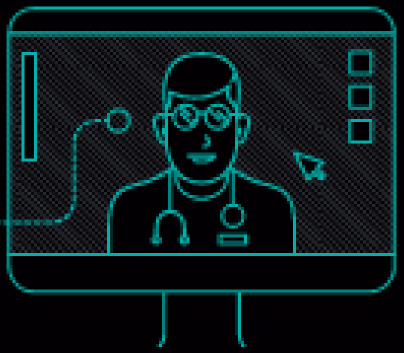
Expectations are high for digitalisation of healthcare

The NHS long term plan

by

2024:

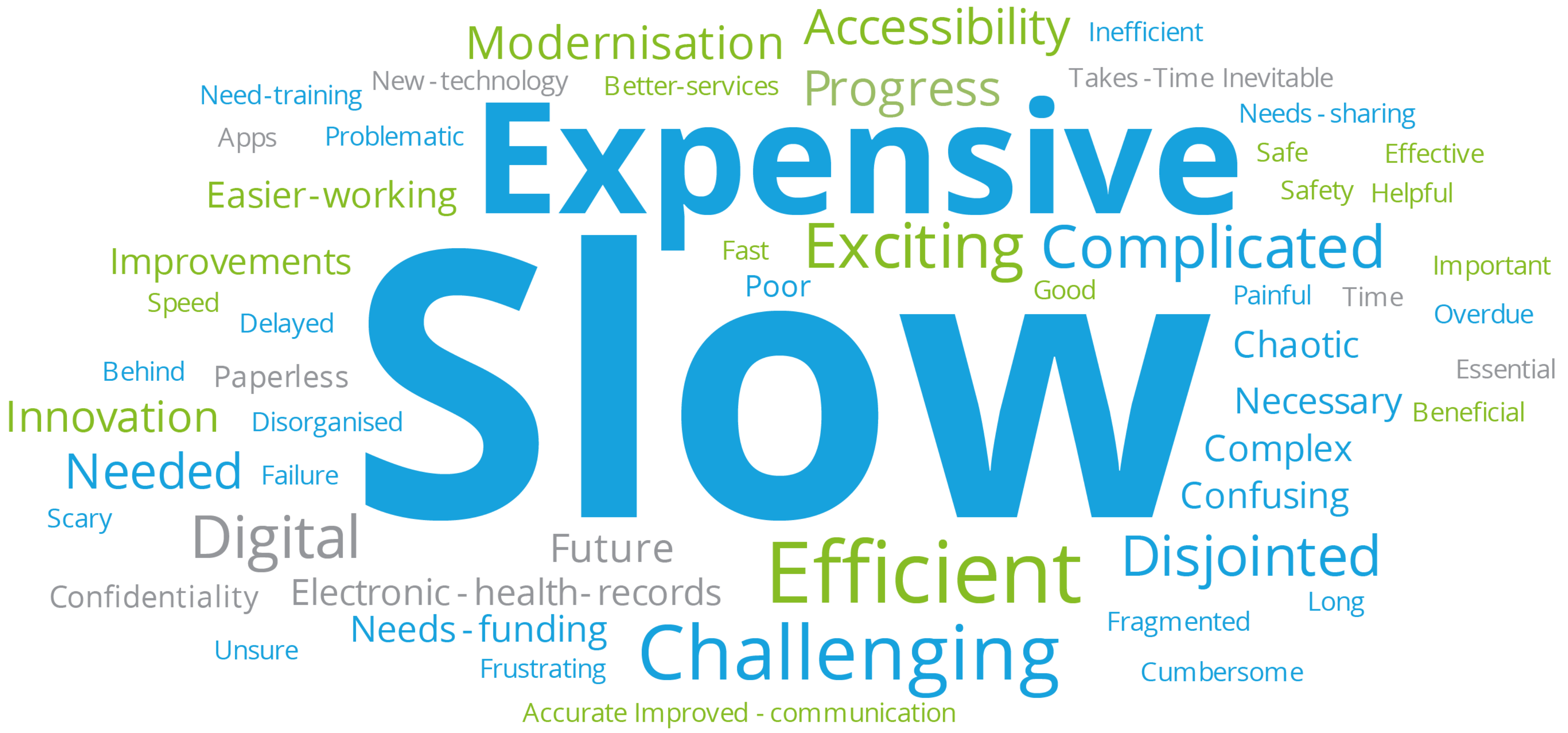
Every patient will have the right to online GP consultations



All clinicians will be able to access patient records wherever they are

All providers and payers are expected to form integrated care systems (ICS) based around pop health and prevention; a key role for primary care and for digitally-enabled care to go mainstream across the NHS. All providers, need to reach a core level of digitalisation by 2024

We asked survey respondents what three words come to mind when thinking about the UK healthcare's journey towards digitalisation?



We asked survey respondents what are the top 3 challenges your organisation is currently facing in implementing digital technology?

1. Cost of technology **55.7%**
2. Finding the right technologies **11.2%**
3. Complexity of technology **9.8%**
4. Bureaucracy in health care **7.8%**
5. Training staff to use technology **6.1%**
6. Convincing staff of the benefits of technology **5.5%**
7. Existence of evidence of outcomes **2.6%**
8. Scaling up the use cases of technologies **0.6%**

We also asked the interviewees what are top three challenges to achieve a digital healthcare system?

Funding	**38%**
Leadership	**22%**
Interoperability	**20%**

Source: Deloitte research and analysis based on survey commissioned from Sermo, 2019.

Expectations are high for digitalisation of healthcare

The NHS long term plan

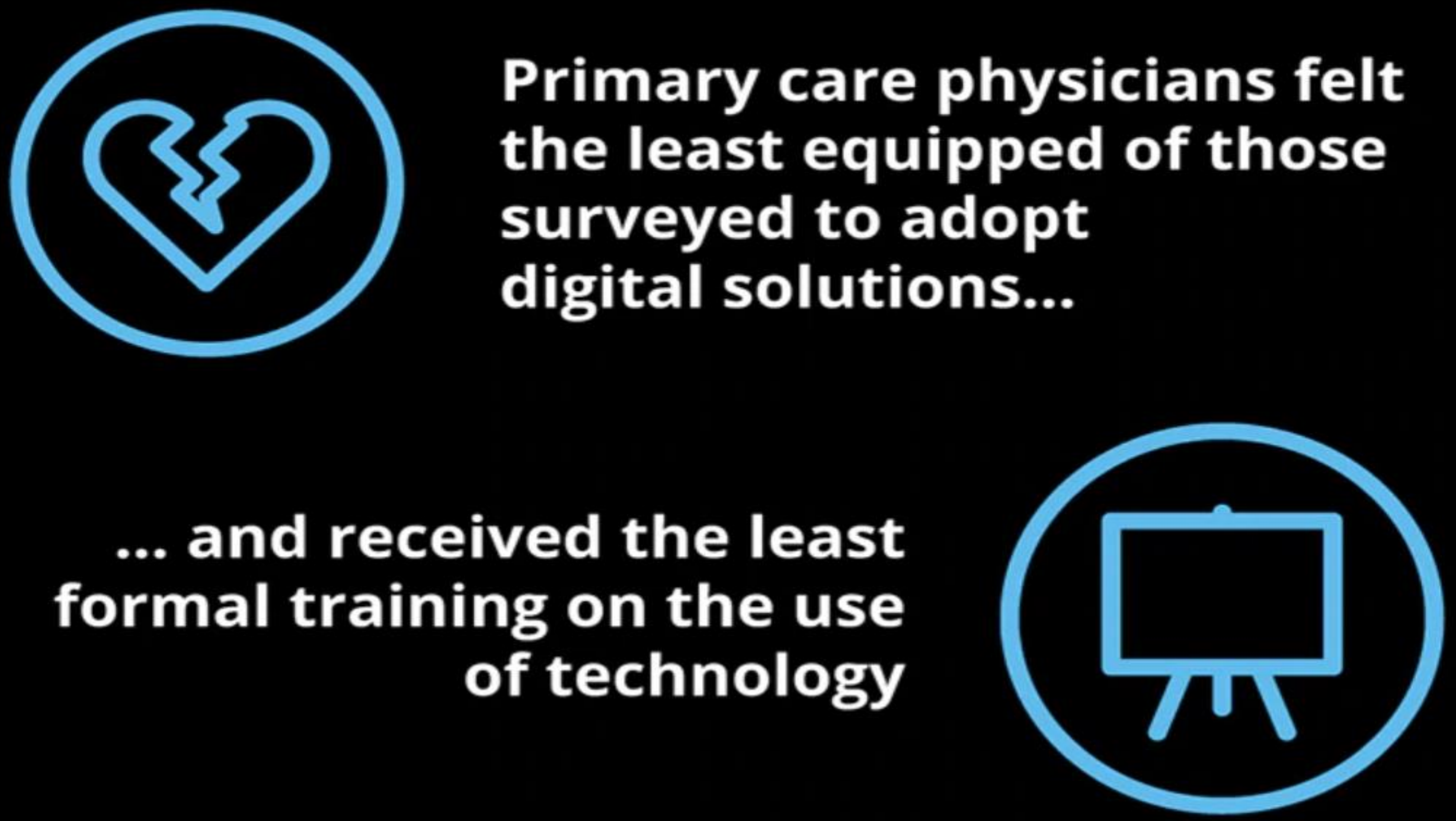
by 2024:

All clinicians will be able to access patient records wherever they are

Every patient will have the right to online GP consultations

What training, if any, does your organisation provide to equip you to use technology?

Most amount of training in general provided in Scotland



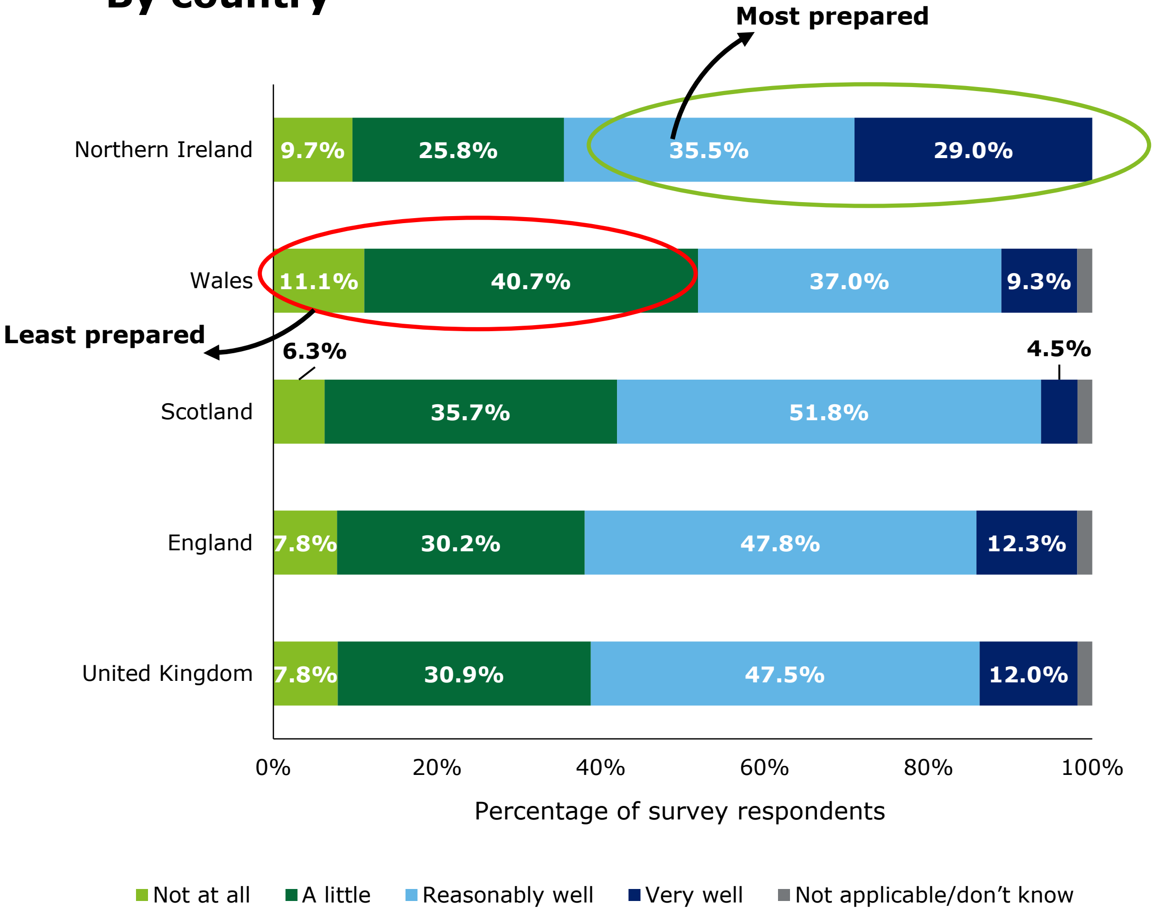
not at all 10% and 46% only a little – vs - to 5 and 33% respectively in secondary care

29% GPs reported no formal training vs 10% hospital doctors

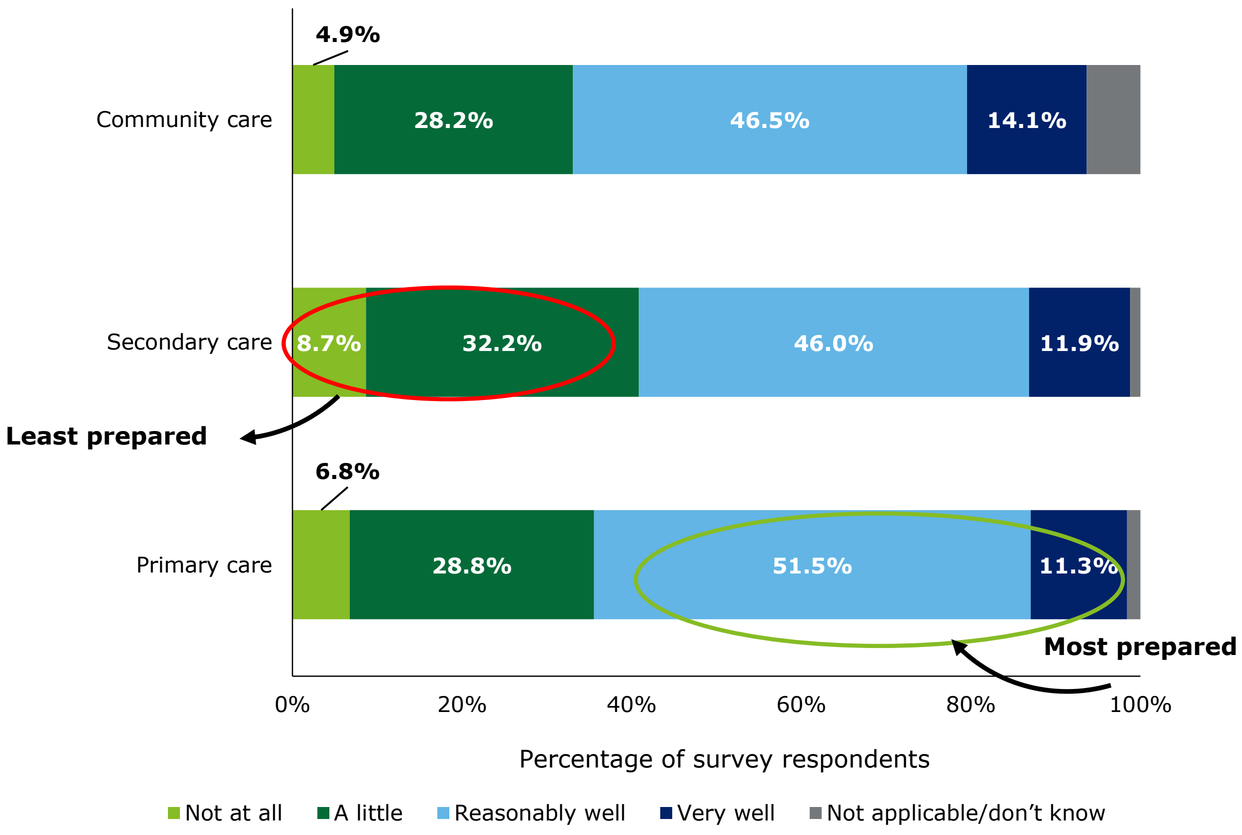
Source: Shaping the future of UK healthcare: Closing the digital gap (2019) Deloitte UK Centre for Health Solutions

How well prepared is your organisation for adopting digital technologies?

By country



By sector of care, UK



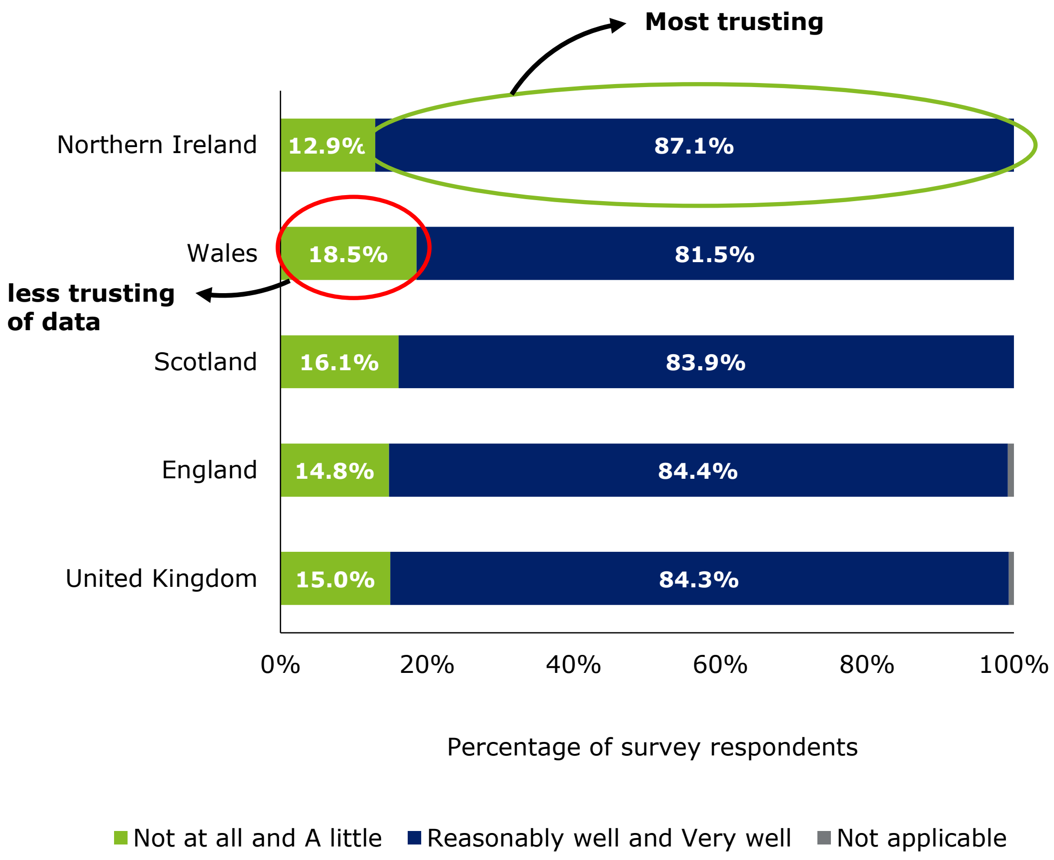
Source: Deloitte research and analysis based on survey commissioned from Sermo, 2019

Survey question: "How well prepared is your organisation for adopting digital technologies?"

Do you trust technology and the data it produces/uses to improve clinical care?

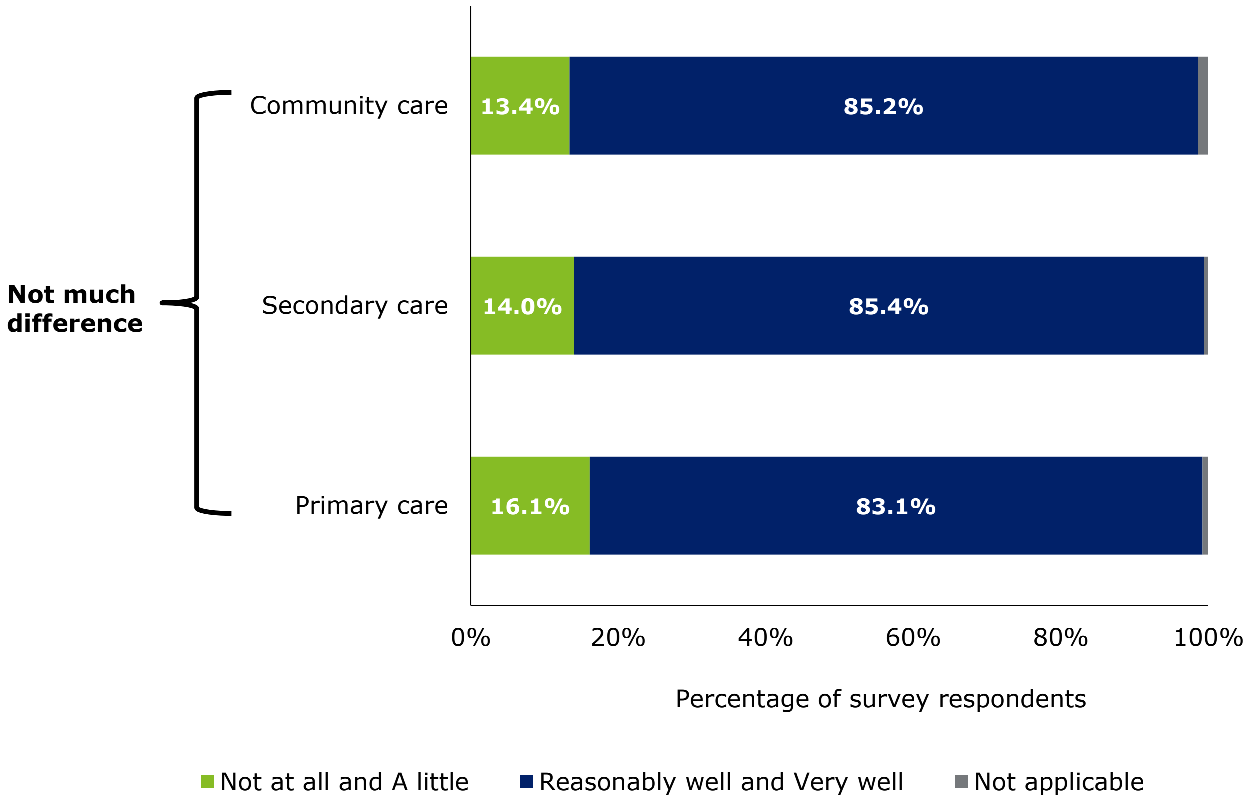
Generally UK health care professionals are trusting of data produced by technology to improve clinical care

By country



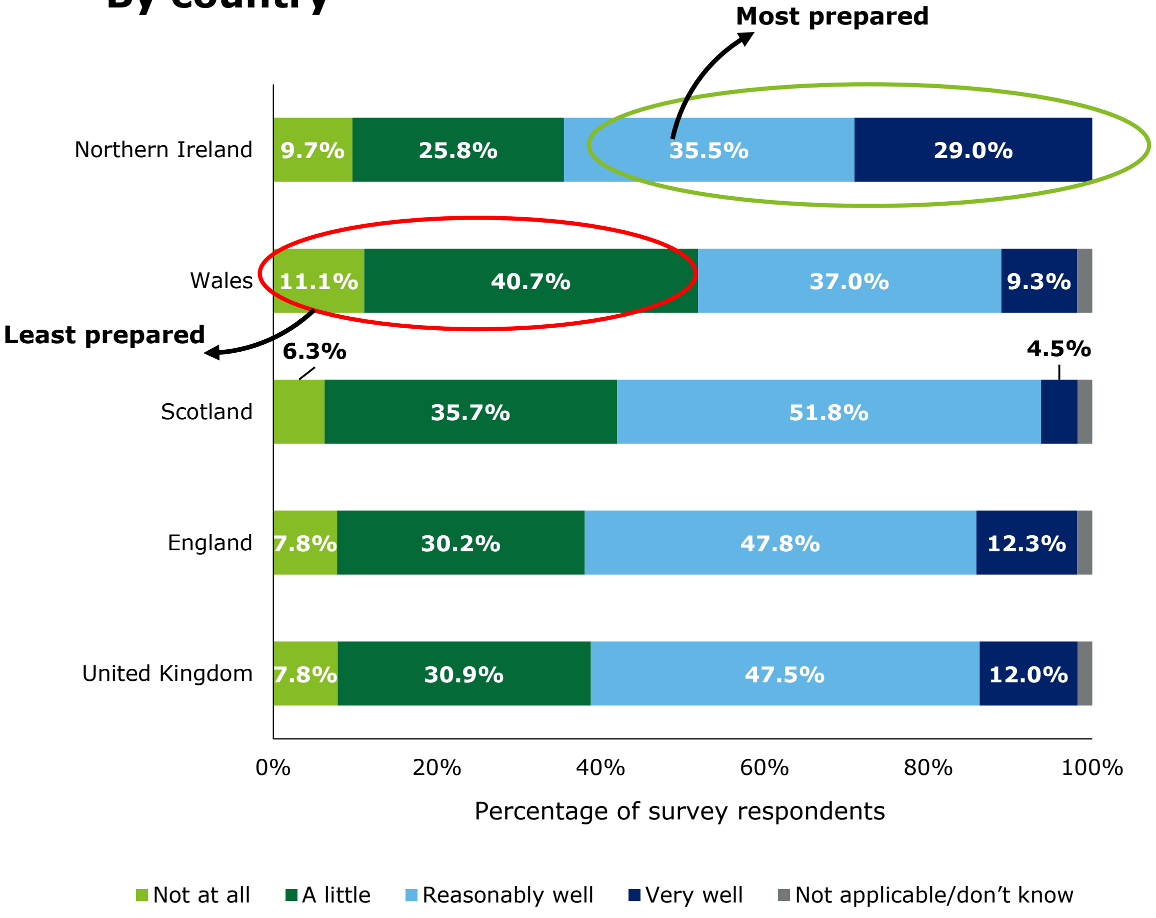
By sector of care, UK

GPs least trusting at 22%

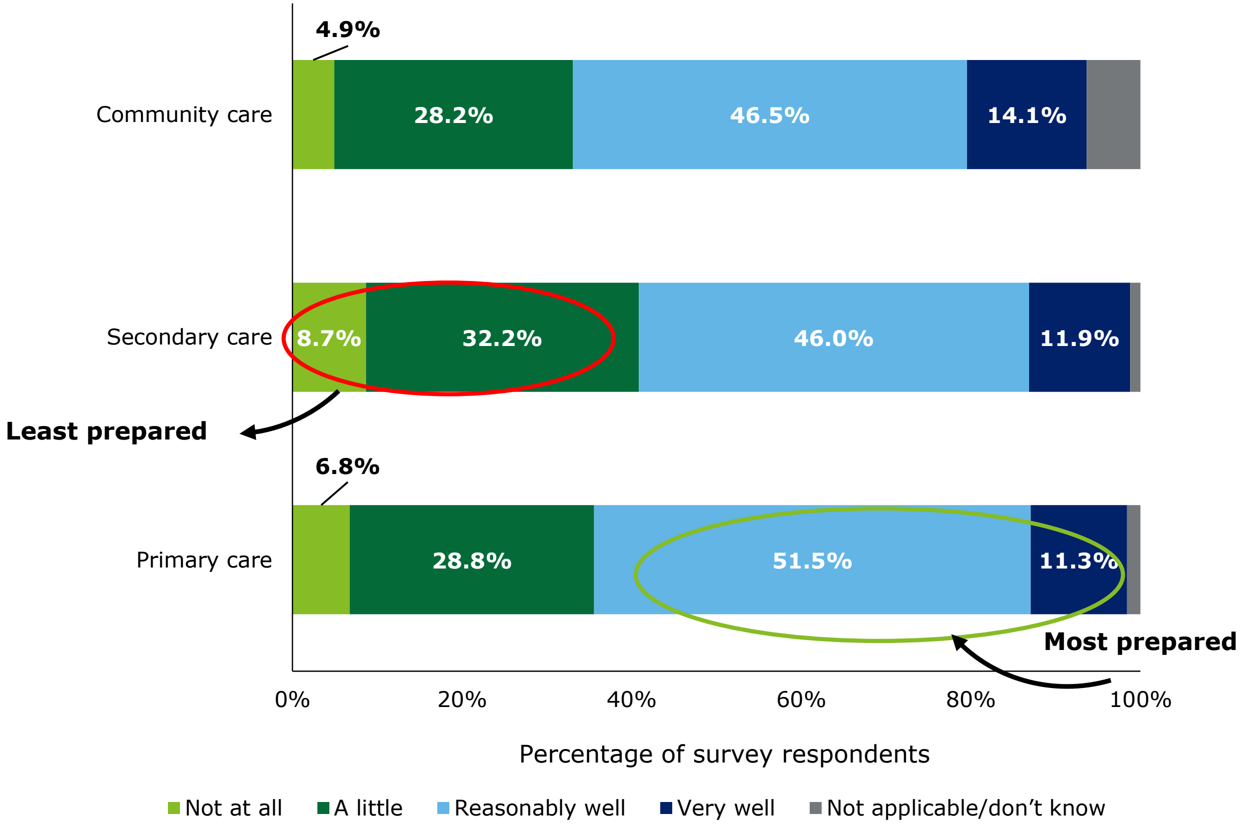


How well prepared is your organisation for adopting digital technologies?

By country



By sector of care, UK

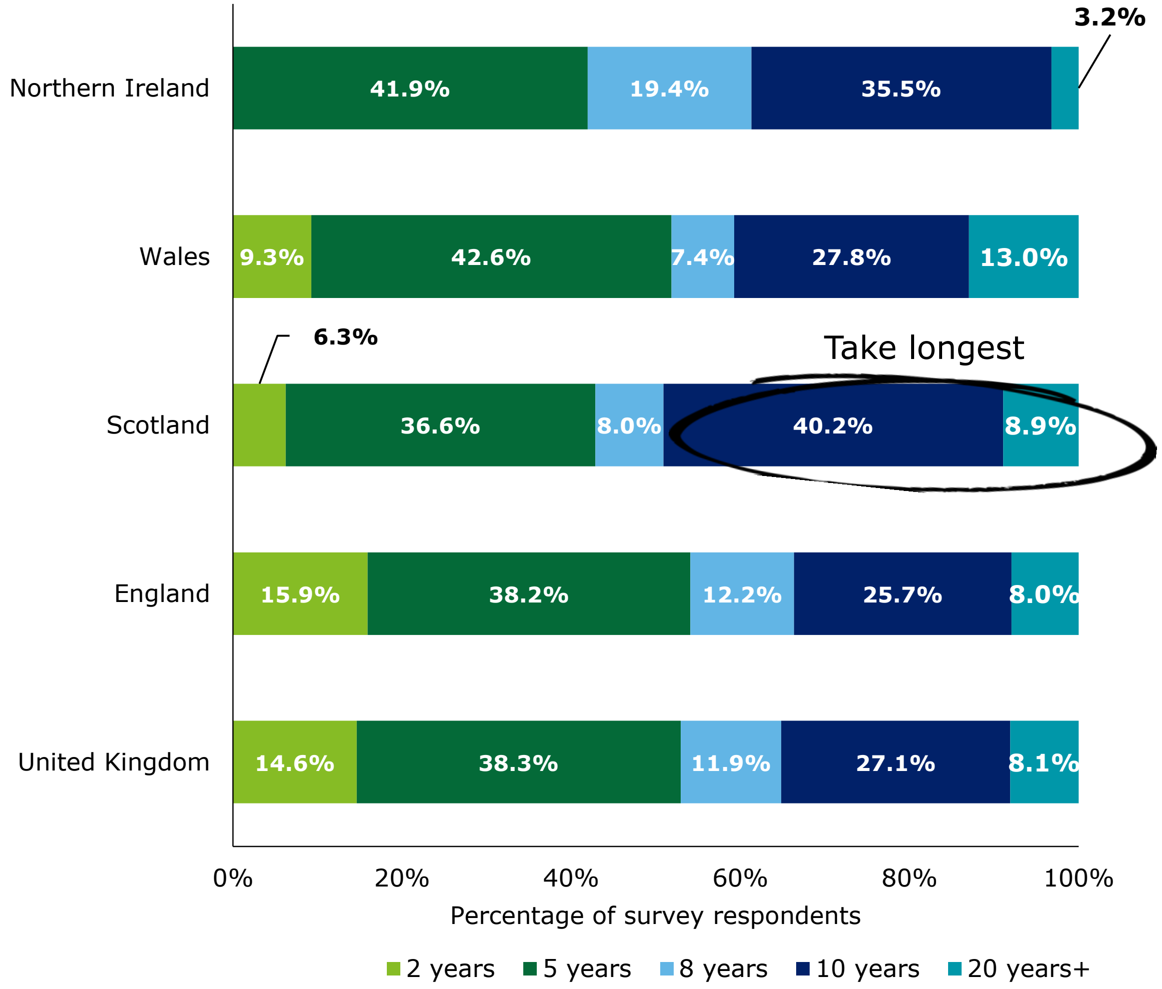


Source: Deloitte research and analysis based on survey commissioned from Sermo, 2019

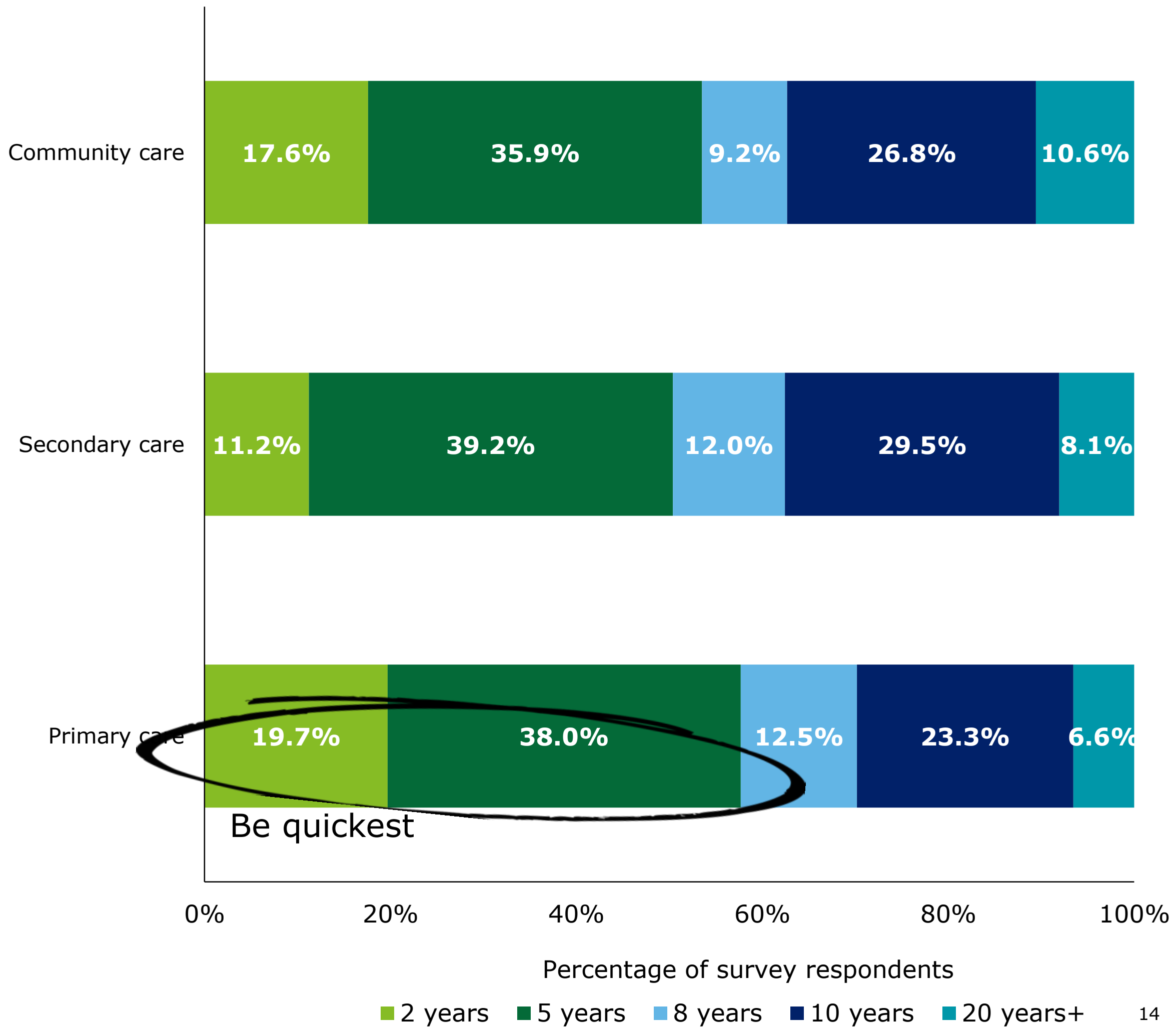
Survey question: "How well prepared is your organisation for adopting digital technologies?"

How long do you think it will take your organisation to become a fully digital organisation (paperless)?

By country



By sector of care, UK



Source: Deloitte research and analysis based on survey commissioned from Sermo, 2019
Survey question: "How long do you think it will take for your organisation to be fully digital organisation?"

We asked survey respondents what are the digital technology that they use the most?

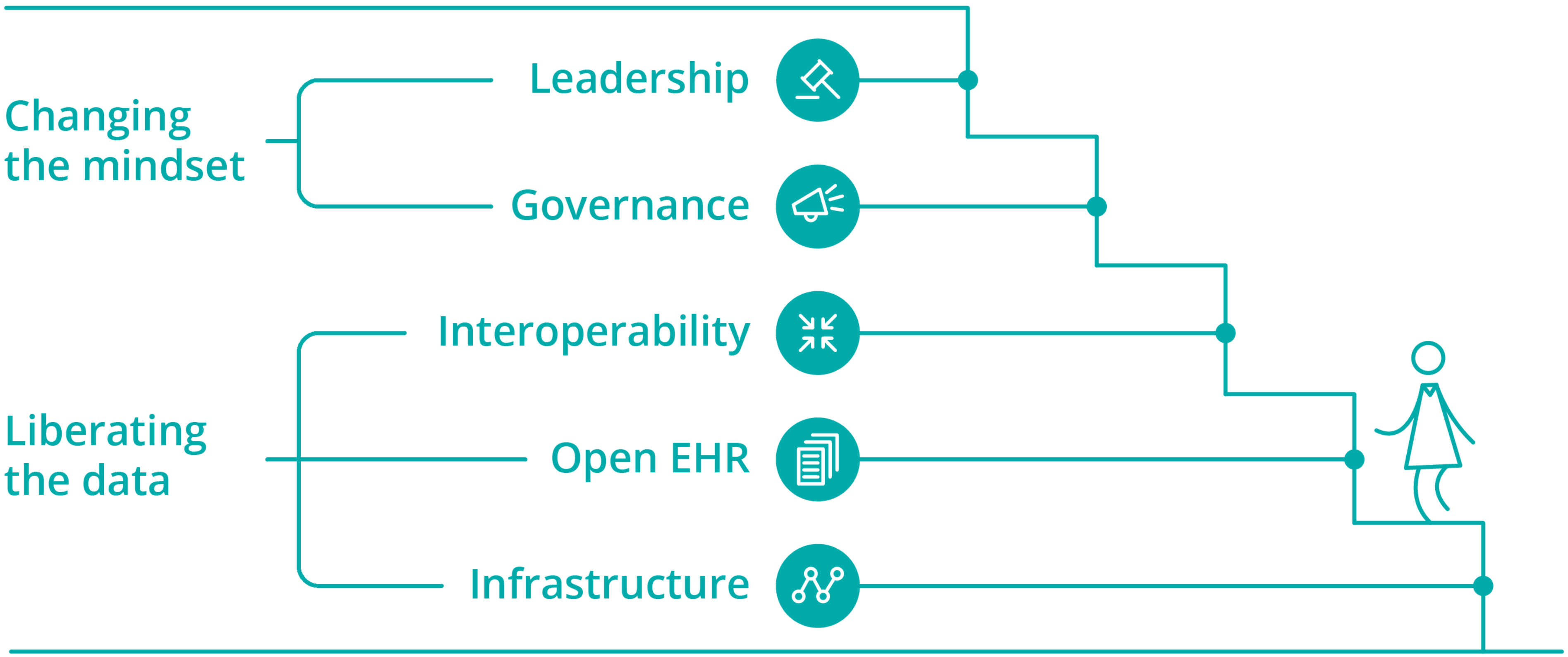
	UK	England	Wales	Scotland	Northern Ireland
Electronic health record	91%	91%	78%	96%	100%
E-prescribing	61%	65%	32%	39%	19%
Point of care diagnostics	42%	43%	44%	28%	48%
E-rostering	41%	42%	41%	29%	23%
Patient apps	29%	29%	19%	30%	29%
Remote vital sign monitoring	25%	26%	20%	15%	23%
Telemedicine	17%	17%	9%	22%	16%
Voice recognition for clinical documentation	15%	15%	13%	16%	3%
Automation of clinical tasks	13%	13%	7%	9%	13%
Wearables	12%	12%	9%	12%	10%
Robotics	7%	7%	9%	4%	3%
Radio frequency Identification tags (RFID)	4%	4%	7%	5%	3%
Virtual reality	3%	3%	2%	3%	–
Artificial intelligence	3%	3%	–	2%	–

Source: Deloitte research and analysis based on survey commissioned from Sermo, 2019

Interview question: "Which of the following digital technologies do you use to support care delivery?"

Note: Data arranged by UK values from largest to smallest

We have identified five key steps to close the digital gap



The SMART characteristics of digital technologies that can help improve adoption at scale

S — Straightforward and easy-to-use

Simple and easy to use technologies

Seemless integration into clinical workflows

M — Measurable impact

Measurable improvement in the efficiency, effectiveness and/or quality of patient care

A — Agile solutions

Agile and affordable technology solutions that can be easily replaced, upgraded and maintained at low cost

R — Reliant on industry collaboration

Working collaboratively with industry innovators and academia

T — Tailored to end-user needs

Helps to deliver dynamic solutions finely tuned to end-user needs

Remote monitoring (telehealth)

Wearables and mobile devices
Sensor, IR monitoring
Video/phone consultation

Facilitation of clinical decision and triage

AI/Deep learning
Augmented reality

Digital and virtual therapies

AI cognitive behavioral therapy
Virtual therapy (pain management, physical rehabilitation, autism social coognition theory

Automation of repetitive processes

Robotics
Voice recognition
Coding

Clinical training

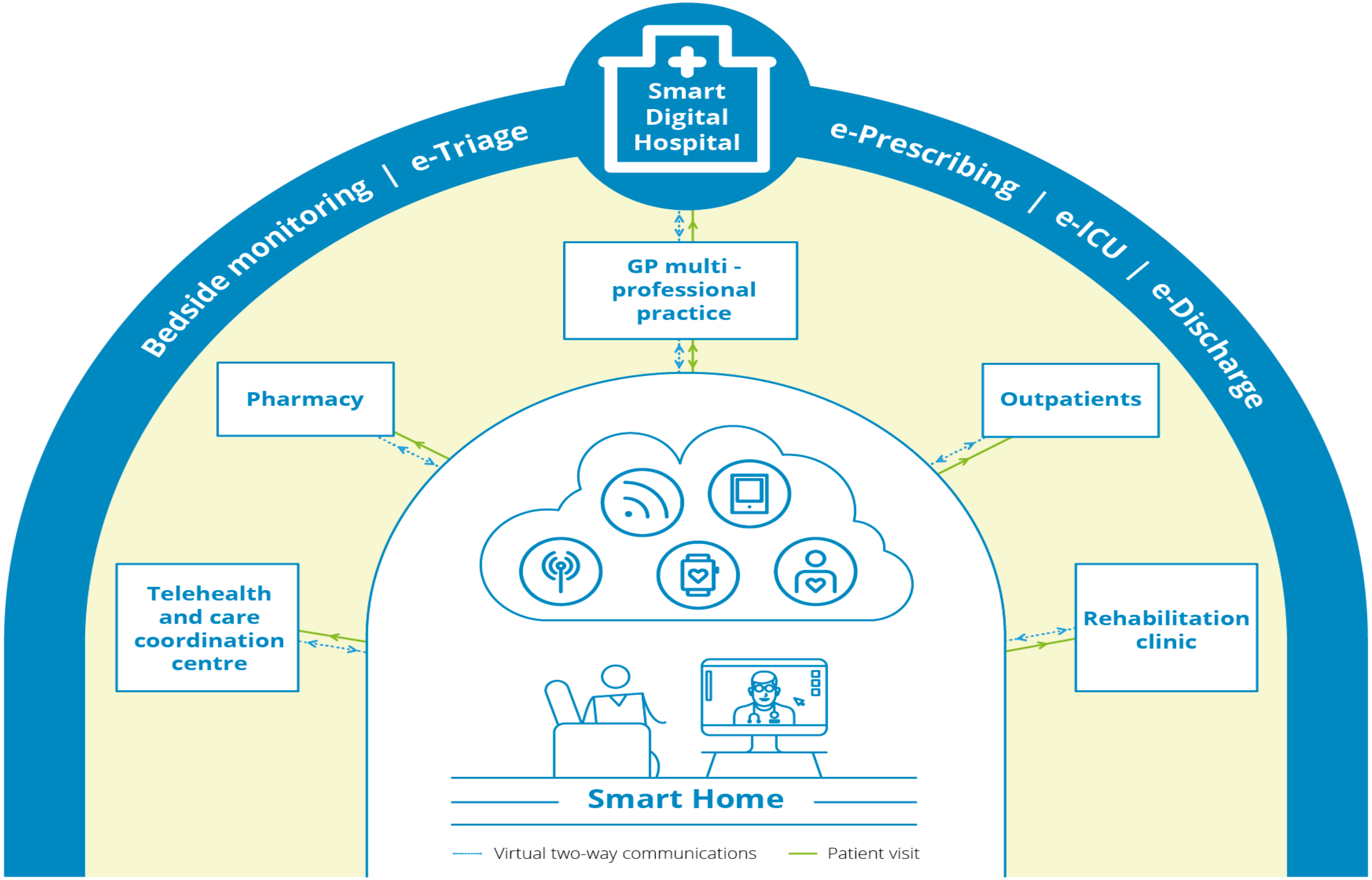
Virtual reality
Augmented reality

Source: Deloitte LLP, 2019

Strategic deployment of digital solutions

- **Remote monitoring** – telehealth - Wearables, mobile and sensor devices, and video consultations are able to monitor and modify patient behaviour in real time, managing chronic conditions with unprecedented levels of accuracy. Intelligent and measurable information is helping to improve the speed and accuracy of earlier diagnosis, improve prevention, target treatments, and reduce hospital readmissions. EG Tunstall tailored digital solutions for falls detection
- **Clinical decision support and triage** - growing body of evidence that AI, and in particular deep learning, enables clinicians to keep pace with advances in research and treatment protocols. It also augments clinical decision making and improves the accuracy and speed of diagnosis in medical imaging and pathology – EG Viz LVO (AI algorithm for detecting Stroke),
- **Clinical training -** AI and virtual and augmented reality solutions can provide training to clinicians in settings, such as ophthalmology, radiology and surgery to reduce errors and improve interpretations.
- **New technologies** have the potential to promote equity and fairness by reaching a larger number of people at a lower cost, with various solutions having a significant impact in supporting the elderly, mentally ill and socially disadvantaged – EG SliverCloud a secure and safe digital platform providing CBT support.

Within next five years – most people's experience will be digital first – primary care led



We asked survey respondents what three words would the hope to use to describe the state of UK digitalisation?

Negative sentiment   Positive sentiment   Neutral sentiment

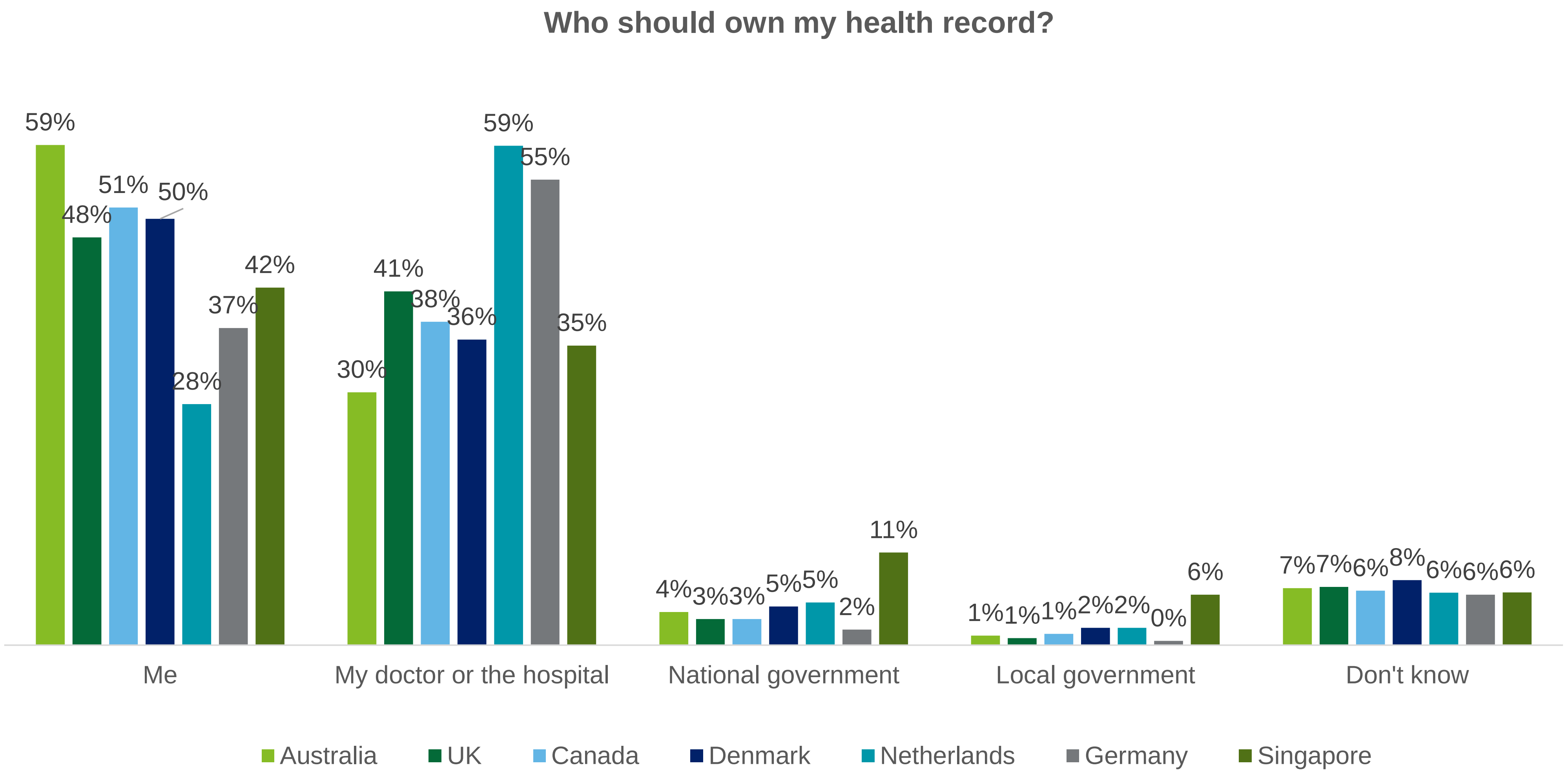
Source: Deloitte research and analysis based on survey commissioned from Sermo, 2019

Survey question: "In 5 years' time what three words would you hope to use to describe the state of digitisation within UK healthcare?"

Note: Figure is representative of the top 60 words used by participant. Colour key: Purple: Negative sentiment; Green: Positive sentiment; Grey: Neutral sentiment

Results from a consumer survey in six countries including UK (4,165 respondents)

Most consumers believe they should own their personal health record, except consumers in Netherlands and Germany where more believe their doctor should.



Question not asked in US.

Deloitte Insights (global comparison across the 8 countries surveyed: Australia, Canada, Denmark, Germany, Netherlands, Singapore, UK, and US) srvey conducted May to June 2019

Consumers are most willing to share their medical record data for personal analysis and drug development for patients with their condition.

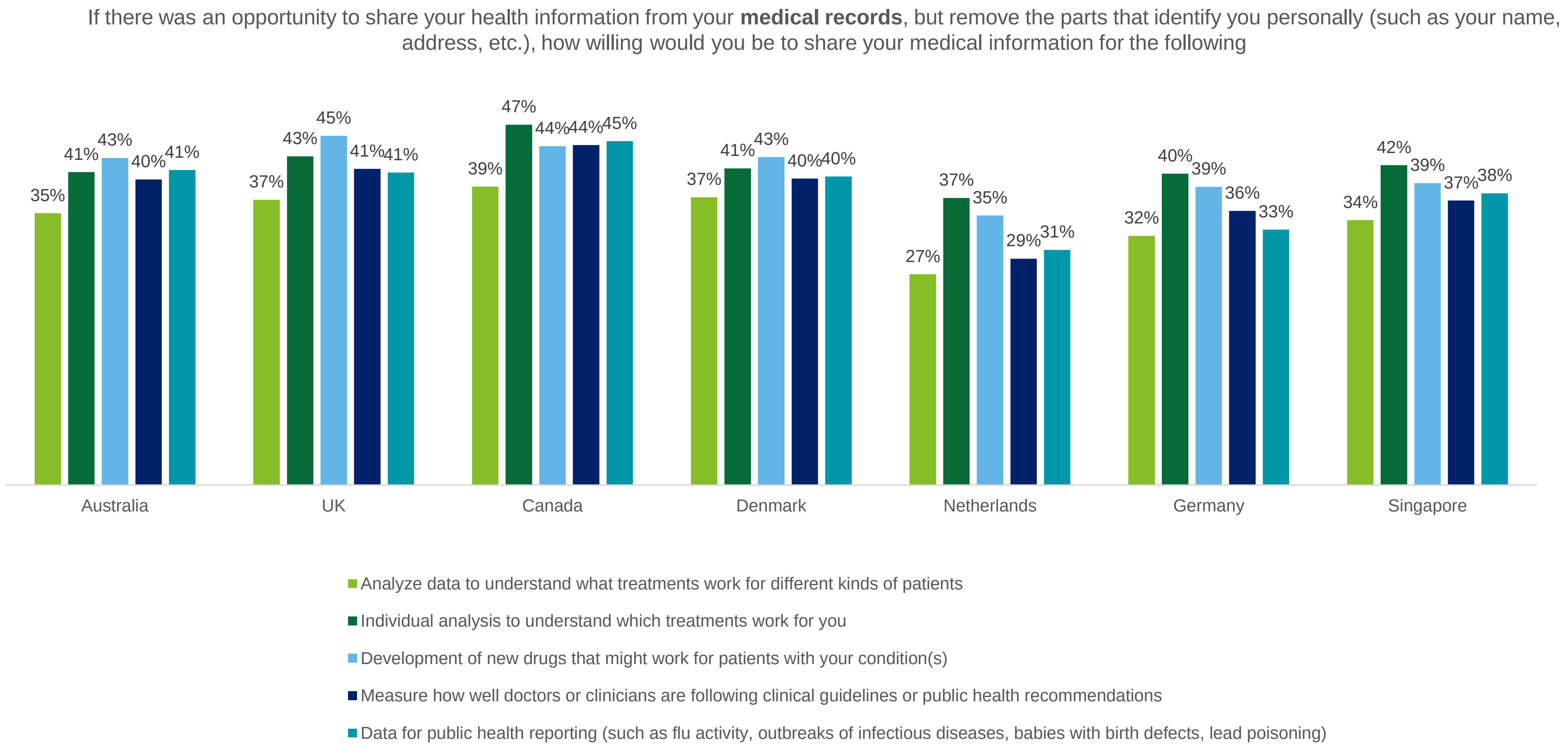


Chart shows percentage who answered 4 or 5 on a 5 point scale, where 1 is "not at all willing' and 5 is 'extremely willing“

Question not asked in US.

Consumers are most willing to share their tracked information (in apps in medical devices) with doctors for their own care, in emergencies, and with their families. US consumers are more willing to share their data across the board.

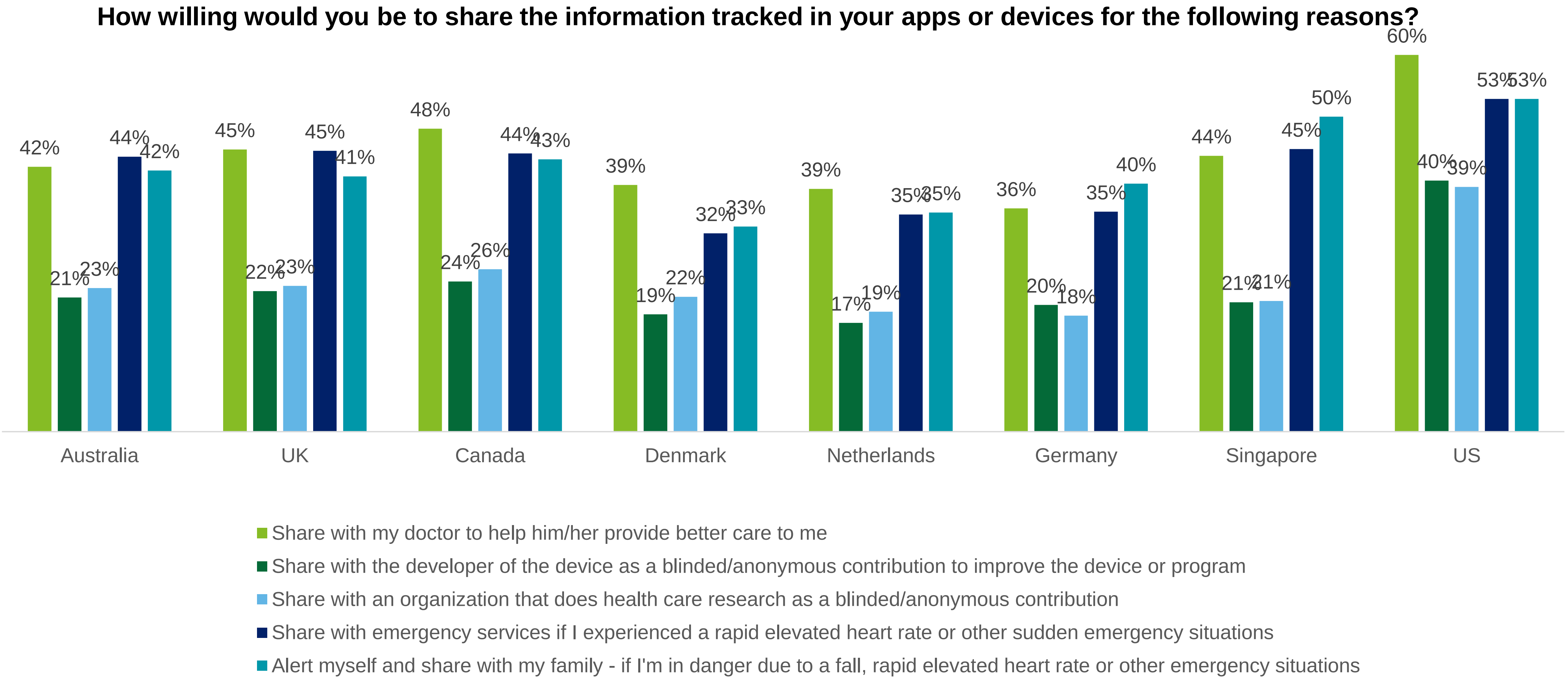
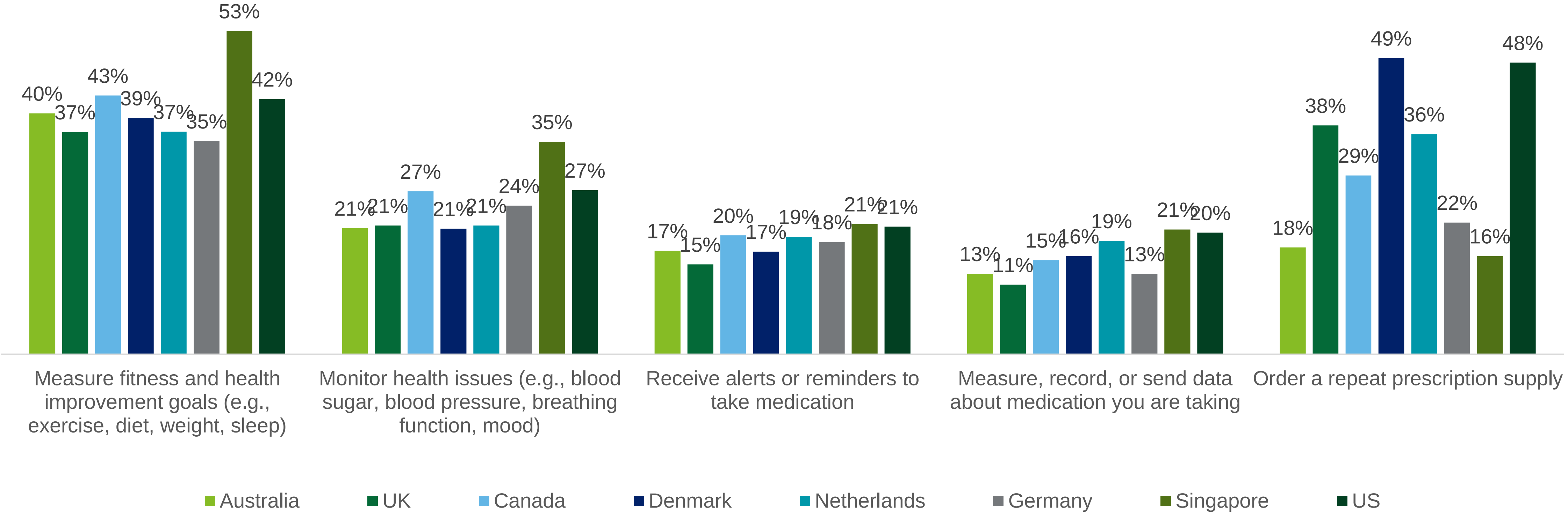


Chart shows percentage who answered 4 or 5 on a 5 point scale, where 1 is "not at all willing' and 5 is 'extremely willing"

Consumers are using technology for measuring fitness, ordering prescription refills, and monitoring health.

In the last 12 months, have you used any technologies including websites, smartphone/tablet apps, personal medical devices or fitness monitors for any of the following health purposes?



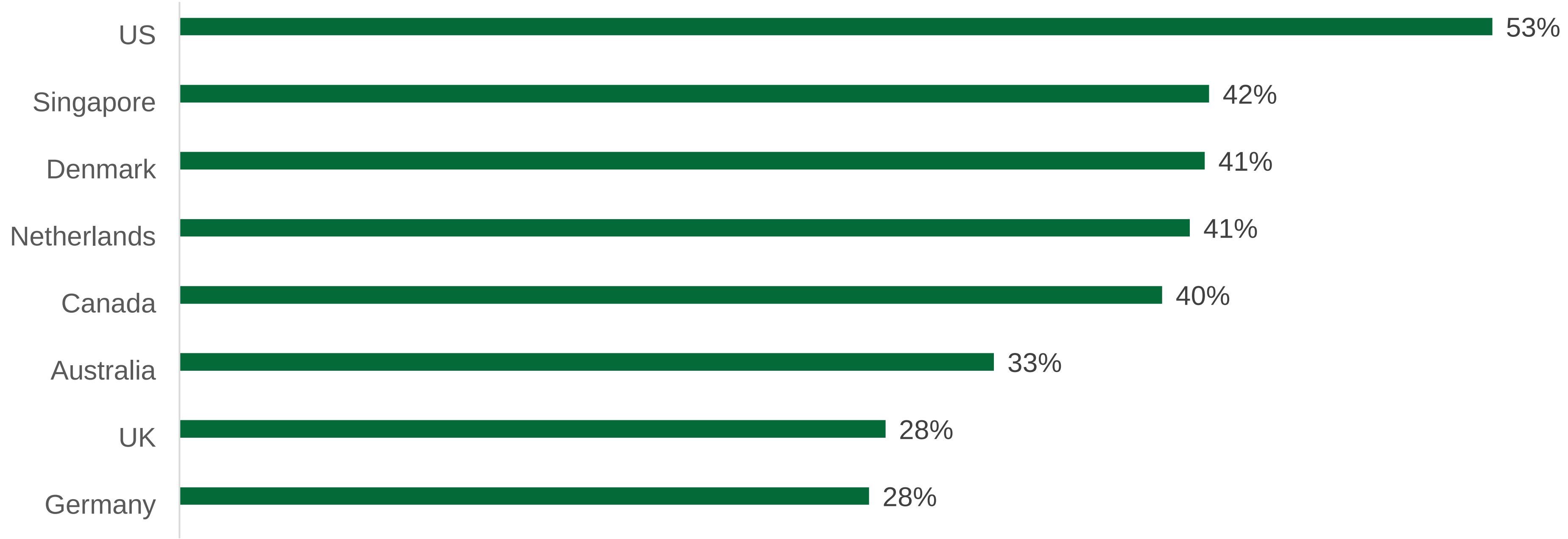
Note: Chart shows % who said "Yes”

Note: Chart shows % who said "Yes”

Source: *Deloitte Center for Health Solutions: 2019 Survey of Health Care Consumers*

Among those consumers who are tracking data (wearables or monitoring devices), consumers in Germany and UK are least likely to share their tracked information with their doctor.

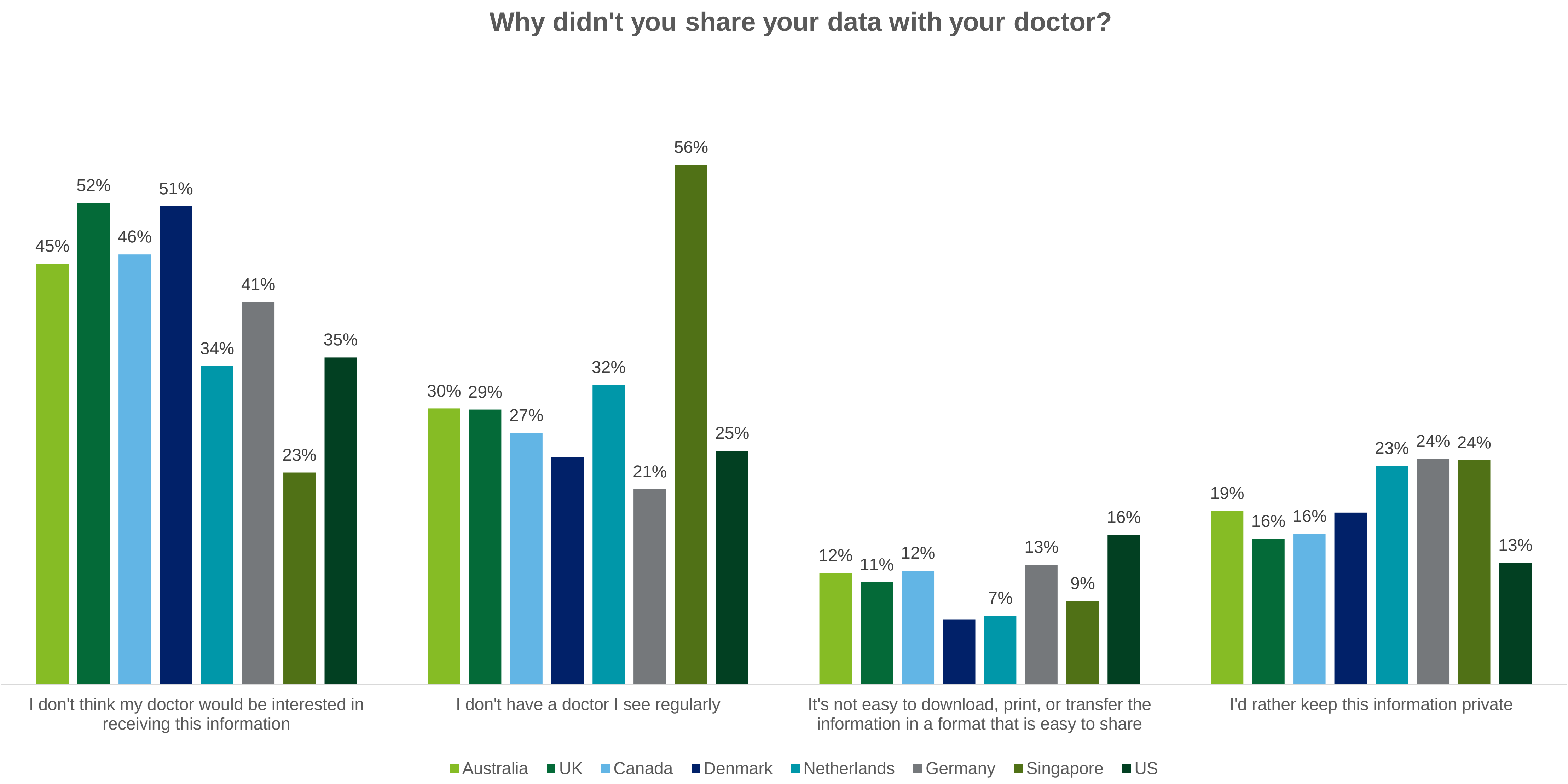
Have you shared any of your tracked health information with a doctor?



- Chart shows percentage who said yes

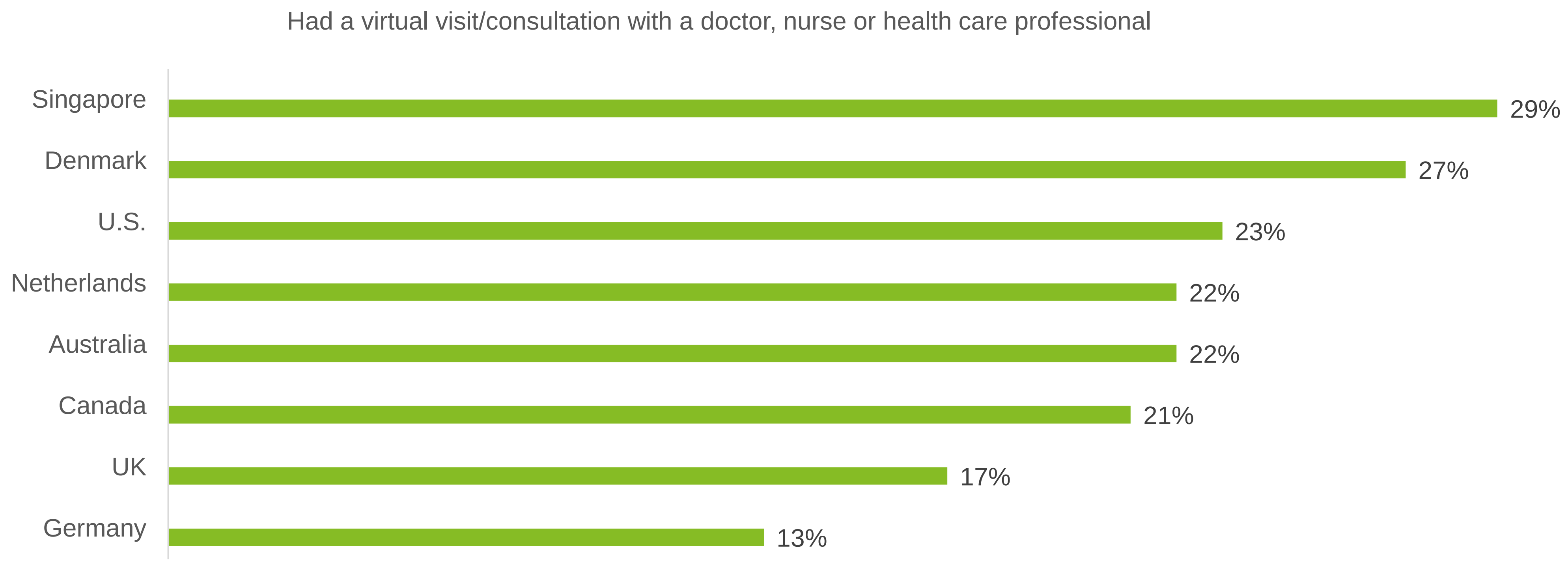
Question not asked in US.

Among those who didn't share their tracked health data, most said they didn't think their doctor would be interested. Except in Singapore where more said they didn't have a regular doctor or they would rather keep information private.



Consumers in Denmark and Singapore are having more virtual visits than those in other countries surveyed

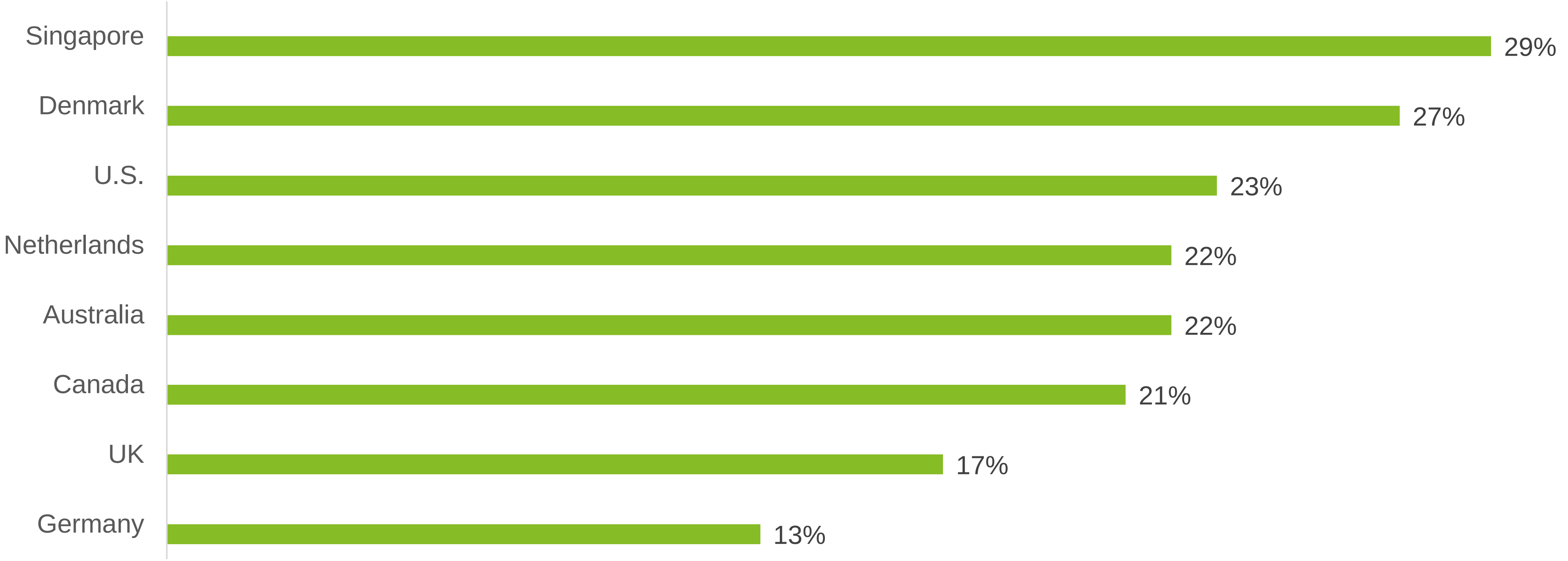
Have you done any of the following?



Source: Deloitte Center for Health Solutions: 2019 Global Health Care Consumer Survey and 2018 Health Care Consumer Survey

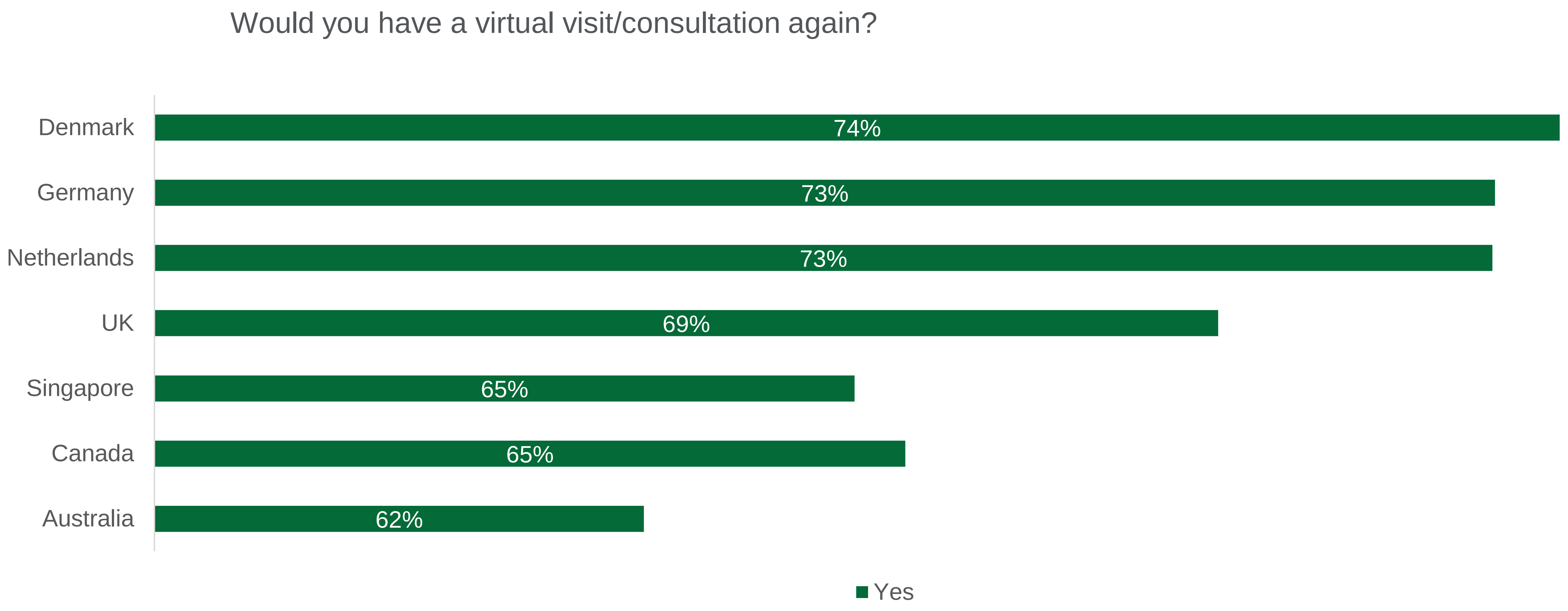
Consumers in Denmark and Singapore are having more virtual visits than those in other countries surveyed

Have you had a virtual visit with a doctor or other HCP?



Source: Deloitte Center for Health Solutions: 2019 Global Health Care Consumer Survey and 2018 Health Care Consumer Survey

A majority of consumers who have had a virtual care visit would choose to have another

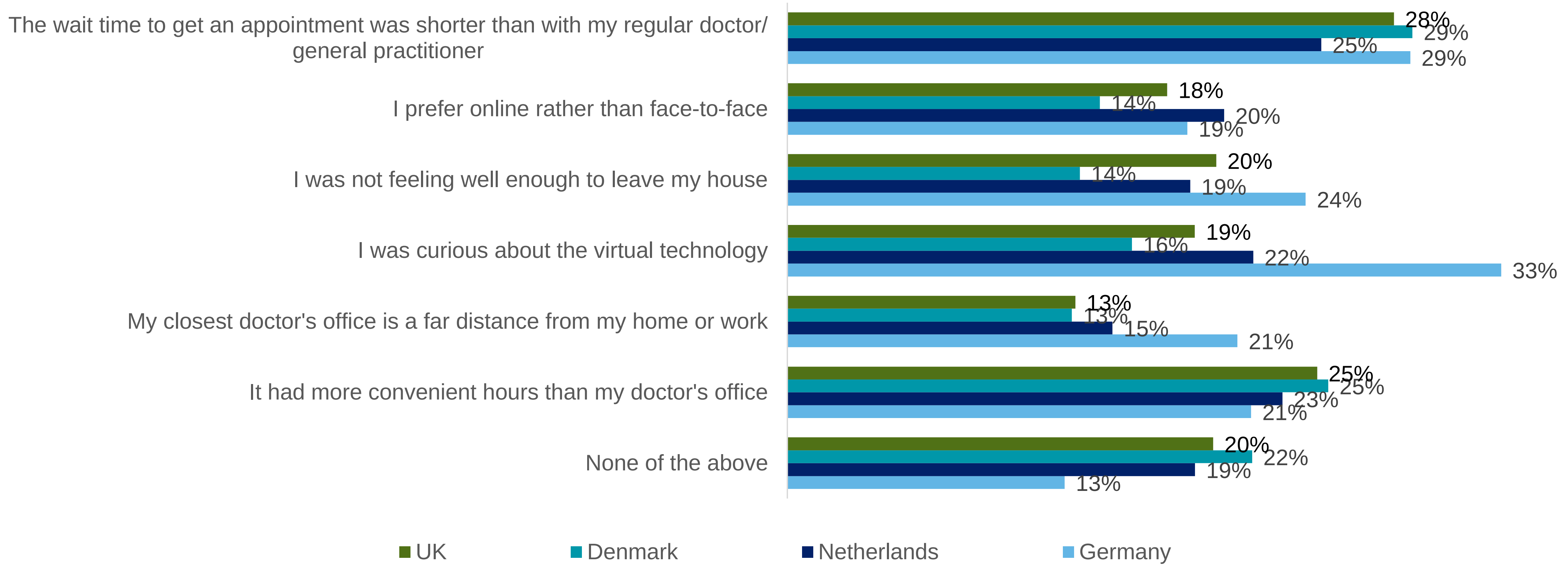


Source: Deloitte Center for Health Solutions: 2019 Global Health Care Consumer Survey

Question not asked in US survey

Germans' curiosity drove utilization of virtual visits

What was the reason you had a virtual visit/consultation instead of seeing a doctor or health care professional in-person?



Source: Deloitte Center for Health Solutions: 2019 Global Health Care Consumer Survey and 2018 Health Care Consumer Survey

Except for the US (where the share is higher), about 20 percent of consumers are very or extremely interested in using apps for engaging with virtual assistants, health coaches, and apps that help them identify health issues.

T2: How interested would you be in using an app (via your phone or digital assistant) for the following?

	Australia	UK	Canada	Denmark	Netherlands	Germany	Singapore	US
Engaging with a virtual assistant who could help you identify your symptoms and direct you to a physician or nurse	21%	21%	27%	19%	17%	22%	24%	35%
Connecting with a "live" health coach through an app that offers 24/7 text messaging for nutrition, exercise, sleep, and stress management	20%	20%	26%	19%	17%	22%	25%	31%
Using an app that has voice recognition software and can recognize your mood from the tone of your voice. This could help improve your health by identifying issues such as depression or anxiety.	19%	18%	22%	16%	14%	18%	22%	29%

Chart shows percentage who answered 4 or 5 on a 5 point scale, where 1 is "not at all willing' and 5 is 'extremely willing"

Source: Deloitte Center for Health Solutions: 2019 Global Health Care Consumer Survey and 2018 Health Care Consumer Survey

In all countries aside from Singapore, consumers are least willing to use a virtual nurse assistant to diagnose an illness in lieu of a doctor visit. (slide 1 of 2)

Technology is changing the way health care is delivered. Imagine you found yourself in each of the following situations. How willing would you be to try the following?

	Australia	UK	Canada	Denmark	Netherlands	Germany	Singapore
You need a surgical procedure. How willing would you be to use a surgeon who is assisted by a surgical robot in the operating room?	33%	35%	34%	39%	38%	33%	30%
You are having symptoms that might be related to a serious condition, like Parkinson's disease. How willing would you be to use a virtual nurse assistant (for example Alexa or Siri) in your home that uses AI to diagnose the type of illness you have and suggest what next treatment or doctor's visit should be next? This would save you a visit to the doctor.	25%	26%	30%	24%	25%	22%	35%
You are a caregiver. How willing would you be to use robots to help monitor an older adult or close relative who was having difficulty staying at home because of a health condition?	31%	31%	34%	30%	30%	32%	41%

Note: Chart shows percentage who answered 4 or 5 on a 5 point scale, where 1 is "not at all willing' and 5 is 'extremely willing“
Question not asked in US.

There is similar interest among countries to use technology in the future. (slide 2 of 2)

Technology is changing the way health care is delivered. Imagine you found yourself in each of the following situations. How willing would you be to try the following?

	Australia	UK	Canada	Denmark	Netherlands	Germany	Singapore
You are taking daily medications. How willing would you be to use voice assistants (like Alexa or Siri) to offer medication reminders?	34%	37%	37%	34%	31%	33%	41%
You need to get medication. How willing would you be to use a service where a drone (an unmanned aerial vehicle) delivers prescription medication to your home from a pharmacy?	31%	31%	34%	30%	30%	32%	41%
You are taking daily medications. How willing would you be to use facial recognition on a smartphone or tablet to help you track that you took your medication as prescribed?	30%	32%	32%	32%	26%	23%	37%
You are a healthy, active adult but have a family history of heart disease. How willing would you be to wear a sensor the size of a paper clip in one of your arteries that would warn you when you are at risk of a heart attack or a stroke.	37%	41%	39%	44%	32%	34%	37%

Note: Chart shows percentage who answered 4 or 5 on a 5 point scale, where 1 is "not at all willing' and 5 is 'extremely willing"
Question not asked in US.

Convenient location and doctor reputation are a top factor for consumers when choosing a doctor in all countries. Availability of appointments concern for UK, Canada, Denmark, Netherlands, and Germany. Cost concerns for US, Singapore and Australia.

When you are searching for a new doctor or medical professional, which of the following do you consider most important? (Choose your top 4)

Australia		**UK**		**Canada**		**US**	
Convenient location	59%	Convenient location	73%	Convenient location	56%	In Network for my health insurance	50%
Bulk billing / private health insurance reimbursement	56%	Availability of appointments/access for new patients	56%	Availability of appointments/access for new patients	53%	Convenient location	46%
Convenient hours	40%	Reputation	54%	Personality / bedside manner	50%	Reputation	39%
Reputation	39%	Convenient hours	53%	Reputation	47%	Personality / bedside manner	34%
Denmark		**Netherlands**		**Germany**		**Singapore**	
Convenient location	60%	Personality / bedside manner	66%	Personality / bedside manner	70%	Price I have to pay/ my out of pocket costs	59%
Personality / bedside manner	56%	Convenient location	55%	Convenient location	57%	Convenient location	57%
Availability of appointments/access for new patients	51%	Availability of appointments/access for new patients	42%	Availability of appointments/access for new patients	54%	Reputation	45%
Reputation	45%	Reputation	36%	Convenient hours	40%	Convenient hours	42%

Source: *Deloitte Center for Health Solutions: 2018 Survey of Health Care Consumers*