



GIG  
CYMRU  
NHS  
WALES

Iechyd Cyhoeddus  
Cymru  
Public Health  
Wales  
Research and Evaluation

# Use of the internet and digital technology to manage health in Wales: past, current, and future preferences

Diana Bright, Karen Hodgson, Enfys Preece, Alisha R. Davies

## Technical Supplement



## Methods and population demographics

Between November 2021 and February 2022, a cross-sectional survey of residents in Wales was conducted by Public Health Wales. The fieldwork was carried out by DJS Research Ltd, a professional Market Research Company. All interviews followed the Market Research Society (MRS) Code of Conduct.

### Sample

A stratified random quota sampling approach was followed to obtain a nationally representative sample of adults aged 16+ across Wales, setting overall targets per Local Health Board (LHB) stratified by Welsh Index of Multiple Deprivation (WIMD). Telephone contacts were selected on a random basis and were split equally between mobile and landline telephone numbers. Quotas to achieve a proportionate number of interviews within each LHB by age, gender and WIMD quintile were set using the latest available population statistics<sup>1</sup>. Using Computer Aided Telephone Interviewing (CATI), a total of 2,027 telephone interviews were completed (5% response rate). Only one CATI interview was conducted per household. To increase the sample size of younger participants, a further 449 interviews were completed using Computer Assisted Personal Interviewing (CAPI). Participants were recruited face-to-face at street locations following the same sampling approach. Given this, the response rate could not be calculated for CAPI interviews. The final sample consisted of N=2,448 respondents who provided complete demographic details.

The population surveyed was representative of the general population of Wales across gender, age, and deprivation quintile (Table S1). The sample was also representative of the general population in terms of rurality (29.8%). The majority of those surveyed were of white ethnicity (95.4%), no weightings were applied but proportions were adjusted by age, gender, and deprivation.

**Table S1. Demographics of the sample compared to ONS mid-year (2020) Welsh population estimates**

		Sample (N=2,448) <sup>1</sup>		Population, ONS 2020 (N=2,606,856)		$\chi^2$
		N	%	N	%	<i>p</i>
<b>Gender</b>	Male	1,196	48.9	1,275,303	48.9	0.077
	Female	1,252	51.1	1,331,553	51.5	
<b>Age group (years)</b>	16-29	359	14.7	553,718	21.2	0.613
	30-44	433	17.7	555,475	21.3	
	45-59	696	28.4	631,657	24.2	
	60-74	717	29.3	559,257	21.5	
	75+	243	9.9	306,749	11.8	
<b>Deprivation quintile</b>	Q1 (most deprived)	436	17.8	488,431	18.7	0.984
	Q2	426	17.4	508,821	19.5	
	Q3	519	21.2	544,041	20.9	
	Q4	541	22.1	539,970	20.7	
	Q5 (least deprived)	526	21.5	525,593	20.2	

<sup>1</sup> N=28 individuals were excluded due to missing demographic data

<sup>2</sup> Using mid-2020 population estimates for Lower Super Output Areas (LSOAs) by gender, age group (ONS, 2020) and deprivation quintile (WIMD; Welsh Government, 2019)

<sup>1</sup> ONS mid-year (2020) Welsh population [estimates](#)

## Questionnaire

The questionnaire content was developed drawing on questions about digital technology, internet use, health status and demographics from validated sources where possible or developed by the research team drawing on themes from the literature (Table S2). The questionnaire was piloted internally by the research team and externally by DJS Research Ltd prior to implementation.

To determine if the participant had regular access to the internet, the questions in Table S2 were asked to classify each participant as either an “internet user” or as a “non-internet user”. Participants were asked whether they used the internet to manage or support their health via five health-related activities. Response options were ‘all of the time’, ‘most of the time’, ‘some of the time’, ‘rarely’, and ‘never’. For the analysis, we focused on frequency of use and responses were categorised into ‘non-user’, ‘low user’, and ‘frequent user’. Participants were also asked about advantages and disadvantages of using internet-based information or services, response options were categorised as ‘agree’, ‘undecided’, and ‘disagree’.

Table S2. Overview of measures, questions and categories included in the report		
Measure	Question (s)	Categories
Access to the internet at home (1) the year prior to the pandemic, and (2) since the pandemic began	(1) Did you have access to the internet at home in the year <b>before</b> the Covid-19 pandemic began (between March 2019 and March 2020)? (2) Since the Covid-19 pandemic began in March 2020, have you had access to the internet at home?	<b>Yes / internet user</b> (via broadband; mobile data; both) <b>No /non-user</b>
Internet use to manage health or look up health resources (1) the year prior to the pandemic; (2) since the pandemic began, and (3) future preferences	(1) Thinking about the same activities, in the year before the pandemic, how frequently did you use the internet? (2) Since the pandemic began in March 2020, when completing the following activities, how frequently have you used the internet? (3) In the future, how often would you like to use digital technology for the following tasks? <ul style="list-style-type: none"> <li>To track healthy behaviours or symptoms (things like monitoring steps or diet, or recording symptoms)</li> <li>To find information about health conditions or health services (e.g. GP opening hours)</li> <li>To request a healthcare appointment or a prescription (other than COVID-19 vaccination)</li> <li>To receive clinical care (e.g. GP consultation or psychological therapy)</li> <li>To look-up for COVID-19 related activities (e.g. symptom tracking, book a vaccination, Test &amp; Trace; for current behaviour only).</li> </ul>	<b>Frequent user</b> (all of the time; most of the time) <b>Low user</b> (some of the time; rarely) <b>Non-user</b> (never)
Long-term conditions	Do you have any physical or mental health conditions or illnesses lasting or expected to last for 12 months or more? <sup>1</sup>	<b>Yes</b> <b>No</b>
Advantages and disadvantages of using internet-based information / services	Can you please tell me how much you agree or disagree with each of the following statements concerning using the internet to support your health? <b>Advantages</b> <ul style="list-style-type: none"> <li>The internet makes it more convenient for me to access the support I need for my health.</li> <li>I prefer the anonymity of using the internet for my health.</li> <li>My experience as a patient is better when I use internet-based options to access healthcare.</li> </ul> <b>Disadvantages</b> <ul style="list-style-type: none"> <li>I worry about the accuracy of health-related information from the internet.</li> <li>I worry about the privacy and security of my data when using the internet for health-related needs.</li> <li>Health resources online do not suit my circumstances / needs.</li> </ul>	<b>Advantages:</b> <b>Agree</b> (strongly agree; agree) <b>Undecided</b> (undecided) <b>Disagree</b> (strongly disagree; disagree) <b>Disadvantages:</b> <b>Agree</b> (strongly agree; agree) <b>Undecided</b> (undecided) <b>Disagree</b> (strongly disagree; disagree)

<sup>1</sup> Validated question from the [National Survey for Wales, 2021](#)

**Table S3. Percentage of those with no internet access at home by demographics and long-term conditions (population sampled; unadjusted)**

		% (95% CI)	$\chi^2$	p
<b>All (N=136)</b>		5.6 (4.6-6.5)	-	-
<b>Gender</b>	Male	5.3 (4.2-6.9)	0.370	0.320
	Female	5.8 (4.8-7.6)		
<b>Age group (years)</b>	16-29	0.4 (-0.1- 0.9)	333.358	<0.001
	30-44	1.0 (0.1-1.8)		
	45-59	1.3 (0.4-2.3)		
	60-74	8.1 (6.3-11.3)		
	75+	27.4 (31.2-44.4)		
<b>Deprivation quintile<sup>1</sup></b>	1 (Most deprived)	8.1 (6.1-11.5)	21.316	<0.001
	2	6.5 (4.6-9.3)		
	3	6.6 (4.8-9.4)		
	4	4.7 (3.0-6.9)		
	5 (Least deprived)	1.8 (0.7-3.1)		
<b>Long-term conditions</b>	With	7.3 (6.2-9.5)	10.560	<0.001
	Without	4.2 (3.3-5.5)		

<sup>1</sup> Welsh Index of Multiple Deprivation – overall quintile ([WIMD; Welsh Government, 2019](#)); CI= confidence interval

**Table S4. Access to the internet at home**

Values are percentages within the population sampled (unadjusted)

Access to the internet (N=2,312)	N	%
<b>Prior access<sup>1</sup></b>	2,301	99.5
<b>New access<sup>2</sup></b>	11	0.5

<sup>1</sup> Had access to the internet at home in the year prior to the pandemic and remained connected through 2020/21

<sup>2</sup> Gained access to the internet at home since the pandemic began

**Table S5. Percentage of those with internet access using the internet frequently to manage their health since the pandemic began**

Unadjusted proportions (95% Confidence Intervals) of the population sampled

Time period		One or more health-related activities <sup>1</sup>	Track healthy behaviours	Find health information	Request an appointment or prescription	Receive clinical care	COVID-19 activities <sup>2</sup>
<b>Since the pandemic began</b>	N	2,312	2,257	2,270	2,256	2,243	2,269
	% (95 CI)	46.3 (44.3-48.4)	22.4 (20.6-24.0)	22.4 (20.8-24.3)	16.3 (14.8-17.8)	8.0 (6.9-9.1)	26.7 (24.9-28.5)

<sup>1</sup> Including all five health-related activities; N values show the number of non-missing values per variable

**Table S6. Percentage of those with internet access using the internet frequently to manage their health**

Unadjusted proportions (95% Confidence Intervals) of the population sampled

Time period		One or more health-related activities <sup>1</sup>	Track healthy behaviours	Find health information	Request an appointment or prescription	Receive clinical care	COVID-19 activities <sup>2</sup>
The year prior to the pandemic	N	2,312	2,254	2,270	2,259	2,247	-
	% (95 CI)	25.3 (23.5-27.1)	15.4 (13.9-16.8)	13.2 (12.0-14.8)	9.2 (8.1-10.4)	2.9 (2.2-3.6)	-
Since the pandemic began	N	2,312	2,257	2,270	2,256	2,243	2,269
	% (95 CI)	39.6 (37.6-41.6)	22.4 (20.6-24.0)	22.4 (20.8-24.3)	16.3 (14.8-17.8)	8.0 (6.9-9.1)	26.7 (24.9-28.5)
Future preferences	N	2,312	2,312	2,312	2,312	2,312	-
	% (95 CI)	53.1 (51.1-55.2)	32.3 (30.4-34.2)	35.0 (33.1-37.0)	35.6 (33.6-37.5)	18.3 (16.8-19.9)	-

<sup>1</sup> Excluding COVID-19 activities

<sup>2</sup> This activity was only included when asking about the period since the pandemic began

N values show the number of non-missing values per variable

**Table S7. Frequent internet use to manage health by socio-demographics and long-term conditions since the pandemic began**

Adjusted proportion (95% confidence intervals) of the population sampled adjusting for age, gender, and deprivation

		Track healthy behaviours (N=2,257)	Find health information (N=2,270)	Request an appointment or prescription (N=2,256)	Receive clinical care (N=2,243)
Gender	Male	17.6 (14.9-20.4)	20.6 (17.9-23.4)	17.1 (14.6-19.6)	6.7 (4.8-8.5)
	Female	25.4 (23.2-27.6)	23.0 (20.9-25.2)	16.2 (14.3-18.2)	9.3 (7.9-10.7)
Age group (years)	16-29	31.0 (26.7-35.3)	28.7 (24.4-33.1)	17.6 (13.7-21.6)	9.4 (6.5-12.4)
	30-44	30.3 (26.4-34.2)	28.2 (24.3-32.1)	17.3 (13.8-20.9)	10.6 (8.0-13.3)
	45-59	26.9 (23.9-30.0)	25.9 (22.9-28.9)	17.8 (15.0-20.6)	10.0 (7.9-12.0)
	60-74	13.2 (10.0-16.3)	15.1 (12.0-18.3)	16.3 (13.4-19.1)	5.6 (3.5-7.8)
	75+	3.4 (2.7-9.6)	5.8 (1.0 – 11.9)	8.9 (3.4-14.4)	3.8 (0.1-7.9)
Deprivation quintile <sup>1</sup>	1 (most deprived)	20.1 (16.0-24.2)	19.4 (15.3-23.5)	14.8 (11.1-18.5)	8.2 (5.5-11.0)
	2	23.5 (19.5-27.6)	24.4 (20.3-28.4)	18.1 (14.4-21.8)	12.6 (9.9-15.3)
	3	22.5 (18.8-26.2)	21.8 (18.1-25.5)	14.9 (11.6-18.3)	7.0 (4.6-9.5)
	4	22.3 (18.8-25.9)	20.8 (17.2-24.3)	16.0 (12.8-19.3)	5.1 (2.7-7.5)
	5 (least deprived)	23.6 (20.1-27.2)	24.1 (20.5-27.7)	18.8 (15.5-22.0)	9.3 (6.9-11.7)
Long-term conditions	With	24.6 (22.1-27.2)	25.4 (22.9-28.0)	22.2 (19.9-24.5)	10.4 (8.7-12.1)
	Without	20.7 (18.5-23.0)	19.4 (17.1-21.7)	11.9 (9.8-14.0)	6.6 (5.0-8.1)

<sup>1</sup> Welsh Index of Multiple Deprivation; overall quintile ([WIMD; Welsh Government, 2019](#))

N values show the number of non-missing values per variable

**Table S8. Future preferences for frequent internet use to manage health by socio-demographics and long-term conditions**

Adjusted proportion (95% confidence intervals) of the population sampled adjusting for age, gender, and deprivation

		Track healthy behaviours (N=2,312)	Find health information (N=2,312)	Request an appointment or prescription (N=2,312)	Receive clinical care (N=2312)
<b>Gender</b>	Male	31.5 (28.5-34.5)	34.0 (30.9-37.1)	36.7 (33.5-39.5)	19.2 (16.6-21.7)
	Female	31.3 (29.0-33.7)	35.3 (32.8-37.7)	35.0 (32.5-37.4)	17.6 (15.6-19.6)
<b>Age group (years)</b>	16-29	39.0 (34.3-43.8)	34.8 (29.9-39.6)	33.7 (28.8-38.6)	20.4 (16.4-24.3)
	30-44	40.8 (36.5-45.2)	44.1 (39.7-48.5)	42.0 (37.5-46.5)	23.6 (19.9-27.2)
	45-59	37.5 (34.1-40.9)	43.8 (40.3-47.3)	42.3 (38.8-45.9)	21.0 (18.1-23.9)
	60-74	20.8 (17.4-24.3)	25.8 (22.2-29.3)	30.6 (27.0-34.2)	13.7 (10.7-16.6)
	75+	9.0 (2.3-15.7)	11.1 (4.2-17.9)	16.5 (9.5-23.5)	6.9 (1.3-12.6)
<b>Deprivation quintile<sup>1</sup></b>	1 (most deprived)	26.5 (22.0-31.0)	30.1 (25.4-34.7)	30.7 (26.0-35.4)	18.4 (14.7-22.2)
	2	34.0 (29.5-38.5)	34.9 (30.2-39.5)	34.7 (30.0-39.4)	17.9 (14.1-21.7)
	3	28.8 (24.7-32.9)	32.9 (28.7-37.1)	36.6 (32.4-40.9)	16.6 (13.2-20.0)
	4	32.8 (28.8-36.7)	33.9 (29.8-38.0)	34.3 (30.1-38.4)	16.7 (13.4-20.1)
	5 (least deprived)	34.2 (30.2-38.1)	41.0 (36.9-45.1)	40.5 (36.3-44.6)	21.2 (17.8-24.5)
<b>Long-term conditions</b>	With	34.4 (31.6-37.2)	37.1 (34.2-40.0)	39.0 (36.1-41.9)	19.5 (17.2-21.9)
	Without	28.9 (26.4-31.4)	32.9 (30.3-35.5)	32.8 (30.2-35.5)	17.1 (14.9-19.2)

<sup>1</sup>Welsh Index of Multiple Deprivation; overall quintile ([WIMD; Welsh Government, 2019](#))

N values show the number of non-missing values per variable

**Table S9. Association between perceived advantages and disadvantages of the internet and frequency of internet use to manage health since the pandemic began**

Values are percentages within the population sampled (unadjusted, association by Chi-squared provided)

	N	Level of agreement	Non-user	Low user	Frequent user	$\chi^2$	p
<b>Advantages</b>							
More convenient to access the support I need for my health <sup>1,2,3</sup>	2,285	Strongly agree / agree	16.0	48.5	65.7	234.466	<b>&lt;0.001</b>
		Undecided	36.3	26.4	19.9		
		Strongly disagree / disagree	47.7	25.1	14.4		
Prefer the anonymity of using the internet for my health <sup>1,3</sup>	2,284	Strongly agree / agree	18.6	34.3	42.9	77.379	<b>&lt;0.001</b>
		Undecided	26.4	30.9	26.2		
		Strongly disagree / disagree	55.4	34.8	34.6		
Better patient experience when using internet based options to access healthcare <sup>1,2,3</sup>	2,285	Strongly agree / agree	8.5	16.2	27.9	55.040	<b>&lt;0.001</b>
		Undecided	26.3	31.3	28.6		
		Strongly disagree / disagree	65.1	52.5	43.4		
<b>Disadvantages</b>							
I worry about the accuracy of online health-related information	2,283	Strongly agree / agree	47.9	53.0	57.3	15.946	0.003
		Undecided	31.1	29.7	23.1		
		Strongly disagree / disagree	21.1	17.3	19.5		
I worry about the privacy and security of my data when using the internet for health-related needs	2,283	Strongly agree / agree	55.4	52.8	51.8	11.351	0.023
		Undecided	22.8	20.4	17.8		
		Strongly disagree / disagree	21.8	26.8	30.4		
Health resources do not suit my needs/ circumstances <sup>1,2,3</sup>	2,286	Strongly agree / agree	53.4	35.8	32.9	87.349	<b>&lt;0.001</b>
		Undecided	26.7	36.9	26.3		
		Strongly disagree / disagree	19.9	27.4	40.8		

Significant difference (p<0.001) between

<sup>1</sup> non-users vs frequent users

<sup>2</sup> low-user vs frequent users

<sup>3</sup> non-users vs low-users

N values show the number of non-missing values per variable



**GIG** | Iechyd Cyhoeddus  
**CYMRU** | Cymru  
**NHS** | Public Health  
**WALES** | Wales  
Research and Evaluation

**ISBN 978-1-83766-149-7**

Use of the internet and digital technology to manage health in Wales: past, current, and future preferences. Technical Supplement

Research and Evaluation Division  
Knowledge Directorate  
Public Health Wales  
Number 2 Capital Quarter  
Tyndall Street  
Cardiff  
CF10 4BZ

Tel: +44 (0)29 2022 7744

Email: [PHW.Research@wales.nhs.uk](mailto:PHW.Research@wales.nhs.uk)

 [@PublicHealthW](https://twitter.com/PublicHealthW) [@PHREWales](https://twitter.com/PHREWales)

 [/PublicHealthWales](https://www.facebook.com/PublicHealthWales)

**[phw.nhs.wales](http://phw.nhs.wales)**