

Secular Trends in Information Communications Technology: Access, Use, and Attitudes of Young and Older Patients With Diabetes

Timothy L. Middleton^{1,2} Maria I. Constantino,^{1,2} Lynda Molyneaux,^{1,2} Turki AlMogbel,^{1,3} Margaret McGill,^{1,2} Dennis K. Yue,^{1,2} Stephen M. Twigg,^{1,2} Ted Wu,¹ and Jencia Wong^{1,2}

<https://doi.org/10.2337/ds17-0082> Published 6 September 2019

Supplementary Data

- Supplementary Tables
- Supplementary Figure

SUPPLEMENTARY MATERIAL

Supplementary Table S1

Self-reported technology related behaviours in 2012 and 2017, stratified by current age

Behaviour	Year	Overall		Under 40 years		Over 40 years	
		Proportion who report behaviour	p value	Proportion who report behaviour	p value	Proportion who report behaviour	p value
Health related internet searching	2012	0.50	<0.001	0.79	0.001	0.43	0.004
	2017	0.74		0.95		0.58	
Regular use of a BGL meter*	2012	0.81	0.01	0.89	0.60	0.79	0.08
	2017	0.89		0.93		0.87	
Download and print data from BGL meter†	2012	0.14	0.002	0.37	0.06	0.09	<0.001
	2017	0.25		0.22		0.28	

* Regular use of a blood glucose meter was defined as use which occurred at least once a day. In the 2012 survey 266 respondents indicated that they owned a BGL meter; 216 respondents (81%) reported testing their blood sugar at least once a day. In the 2017 survey 268 respondents indicated that they owned a BGL meter; 239 respondents (89%) reported testing their blood sugar at least once a day.

† In 2012, 264 owners of a BGL meter responded to Q20 of the survey (Have you ever connected a glucose meter to a computer to print out your blood sugar readings?). In 2012, 38 respondents (14%) answered in the affirmative to Q20. In 2017, 266 owners of a BGL meter responded to Q20 of the survey and 67 respondents (25%) answered in the affirmative.

Supplementary Table S2

Comparative Demographics of Survey Respondents and Clinic Population (Jan-Apr 2012)

		Survey Respondents (n=300)	Clinic Population (n=1815)
Gender	Male	174 (58.0)	902 (49.7)
	Female	120 (40.0)	913 (50.3)
	Not disclosed	6 (2.0)	-
Current Age	<30	22 (7.3)	42 (2.3)
	30 to <40	35 (11.7)	237 (13.1)
	40 to <50	33 (11.0)	261 (14.4)
	50 to <60	71 (23.7)	205 (11.3)
	60 to <70	83 (27.7)	378 (20.8)
	≥70	49 (16.3)	683 (37.6)
	Not disclosed	7 (2.3)	-
Type of Diabetes	T1DM	61 (20.3)	290 (16.0)
	T2DM	189 (63.0)	1207 (66.5)
	GDM	1 (0.3)	270 (14.9)
	Other	-	48 (2.6)
	Don't know	34 (11.3)	-
	Not disclosed	15 (5.0)	-

Supplementary Table S3

Comparative Demographics of Survey Respondents and Clinic Population (Mar-Jun 2017)

		Survey Respondents (n=314)	Clinic Population (n=1960)
Gender	Male	129 (41.1)	914 (46.6)
	Female	180 (57.3)	1046 (53.4)
	Not disclosed	5 (1.6)	-
Current Age	<30	35 (11.1)	126 (6.4)
	30 to <40	94 (29.9)	413 (21.1)
	40 to <50	42 (13.4)	239 (12.2)
	50 to <60	44 (14.0)	278 (14.2)
	60 to <70	57 (18.2)	412 (21.0)
	≥70	36 (11.5)	492 (25.1)
	Not disclosed	6 (1.9)	-
Type of Diabetes	T1DM	62 (19.7)	325 (16.6)
	T2DM	148 (47.1)	1169 (59.6)
	GDM	79 (25.2)	394 (20.1)
	Other	-	72 (3.7)
	Don't know	20 (6.4)	-
	Not disclosed	5 (1.6)	-

Supplementary Table S4a:

Self-reported access to technology in 2012 and 2017, stratified by gender

Technology	Year	Male	Female	p value
		Proportion with access	Proportion with access	
Computer	2012	0.77	0.67	0.09
	2017	0.75	0.76	0.96
Tablet	2012	0.18	0.11	0.17
	2017	0.50	0.58	0.21
Mobile phone	2012	0.84	0.82	0.77
	2017	0.85	0.89	0.26
Internet access	2012	0.78	0.67	0.05
	2017	0.87	0.90	0.40
No technology	2012	0.11	0.10	0.95
	2017	0.03	0.03	1

Supplementary Table S4b:

Mobile phone feature utilization in 2012 and 2017, stratified by gender

Feature	Year	Male	Female	p value
		Proportion utilizing feature	Proportion utilizing feature	
Phone calls	2012	0.86	0.81	0.42
	2017	0.92	0.88	0.37
SMS	2012	0.60	0.56	0.54
	2017	0.85	0.84	1
Mobile internet	2012	0.30	0.31	1
	2017	0.63	0.72	0.11
Other apps	2012	0.27	0.30	0.65
	2017	0.42	0.48	0.41

Supplementary Table S4c:

Patient comfort with technology and technology-based support stratified by gender

Technology / Tech-based support	Year	Male	Female	p value
		Proportion who are comfortable or very comfortable	Proportion who are comfortable or very comfortable	
Technology in general	2012	0.62	0.52	0.13
	2017	0.77	0.78	0.78
Technology in diabetes	2012	0.64	0.54	0.13
	2017	0.73	0.76	0.61
Email contact from Diabetes Centre	2012	0.67	0.56	0.08
	2017	0.62	0.78	0.005
Web-based diabetes consultation	2012	0.32	0.29	0.62
	2017	0.34	0.45	0.08
Online diabetes support group	2012	0.24	0.20	0.48
	2017	0.30	0.34	0.47

Supplementary Table S5a:

Self-reported access to technology in 2012 and 2017, stratified by diabetes type

Technology	Year	Type 1	Type 2	p value
		Proportion with access	Proportion with access	
Computer	2012	0.90	0.70	0.003
	2017	0.82	0.70	0.10
	Overall	0.86	0.70	0.001
Tablet	2012	0.20	0.14	0.42
	2017	0.57	0.46	0.22
	Overall	0.38	0.28	0.06
Mobile phone	2012	0.97	0.80	0.003
	2017	0.98	0.81	0.002
	Overall	0.98	0.80	<0.001
Internet access	2012	0.90	0.72	0.006
	2017	0.90	0.85	0.45
	Overall	0.90	0.78	0.004
No technology	2012	0.02	0.12	0.03
	2017	0	0.07	0.08
	Overall	0.01	0.10	0.002

Supplementary Table S5b:

Mobile phone feature utilization in 2012 and 2017, stratified by diabetes type

Feature	Year	Type 1	Type 2	p value
		Proportion utilizing feature	Proportion utilizing feature	
Phone calls	2012	0.97	0.80	0.004
	2017	0.95	0.94	1
	Overall	0.96	0.86	0.006
SMS	2012	0.89	0.48	<0.001
	2017	0.92	0.76	0.02
	Overall	0.90	0.60	<0.001
Mobile internet	2012	0.89	0.48	<0.001
	2017	0.92	0.76	0.006
	Overall	0.66	0.60	<0.001
Other apps	2012	0.46	0.22	0.001
	2017	0.48	0.43	0.54
	Overall	0.47	0.31	0.002

Supplementary Table S5c:

Patient comfort with technology and technology-based support stratified by diabetes type

Technology / Tech-based support	Year	Type 1	Type 2	p value
		Proportion who are comfortable or very comfortable	Proportion who are comfortable or very comfortable	
Technology in general	2012	0.83	0.52	<0.001
	2017	0.71	0.70	0.98
	Overall	0.77	0.60	0.001
Technology in diabetes	2012	0.76	0.55	0.008
	2017	0.70	0.66	0.71
	Overall	0.73	0.60	0.02
Email contact from Diabetes Centre	2012	0.80	0.60	0.007
	2017	0.69	0.62	0.38
	Overall	0.75	0.61	0.009
Web-based diabetes consultation	2012	0.46	0.28	0.01
	2017	0.40	0.33	0.42
	Overall	0.43	0.30	0.01
Online diabetes support group	2012	0.25	0.22	0.71
	2017	0.37	0.30	0.39
	Overall	0.31	0.25	0.27

Supplementary Table S6a:

Comparison of self-reported access to technology in type 1 and type 2 diabetes, stratified by age group of respondent (<40 vs ≥40 years of age)

Technology	Year	Type 1	Type 2	p value
		Proportion with access	Proportion with access	
Computer	<40	0.91	0.87	0.84
	≥40	0.85	0.69	0.02
	Overall	0.88	0.70	<0.001
Tablet	<40	0.38	0.43	0.80
	≥40	0.40	0.27	0.08
	Overall	0.39	0.29	0.05
Mobile phone	<40	0.98	0.83	0.02
	≥40	0.97	0.80	0.004
	Overall	0.98	0.80	<0.001
Internet access	<40	0.94	0.97	0.91
	≥40	0.90	0.76	0.04
	Overall	0.92	0.78	0.001
No technology	<40	0	0	-
	≥40	0.02	0.11	0.06
	Overall	0.01	0.10	0.003

Supplementary Table S6b:

Comparison of mobile phone feature utilization in type 1 and type 2 diabetes, stratified by age group of respondent (<40 vs ≥40 years of age)

Feature	Year	Type 1	Type 2	p value
		Proportion utilizing feature	Proportion utilizing feature	
Phone calls	<40	0.97	0.93	0.79
	≥40	0.95	0.85	0.08
	Overall	0.96	0.86	0.006
SMS	<40	0.98	0.86	0.06
	≥40	0.85	0.58	<0.001
	Overall	0.92	0.60	<0.001
Mobile internet	<40	0.83	0.86	0.89
	≥40	0.50	0.34	0.03
	Overall	0.67	0.39	<0.001
Other apps	<40	0.64	0.62	1
	≥40	0.31	0.28	0.71
	Overall	0.48	0.31	0.001

Supplementary Table S6c:

Comparison of patient comfort levels in type 1 and type 2 diabetes, stratified by age group of respondent (<40 vs ≥40 years of age)

Technology / Tech-based support	Year	Type 1	Type 2	p value
		Proportion who are comfortable or very comfortable	Proportion who are comfortable or very comfortable	
Technology in general	<40	0.86	0.90	0.79
	≥40	0.70	0.57	0.08
	Overall	0.78	0.60	<0.001
Technology in diabetes	<40	0.82	0.80	1
	≥40	0.65	0.58	0.37
	Overall	0.74	0.60	0.009
Email contact from Diabetes Centre	<40	0.79	0.77	0.98
	≥40	0.72	0.60	0.11
	Overall	0.76	0.61	0.005
Web-based diabetes consultation	<40	0.49	0.48	1
	≥40	0.36	0.28	0.32
	Overall	0.43	0.30	0.01
Online diabetes support group	<40	0.38	0.27	0.42
	≥40	0.25	0.25	1
	Overall	0.32	0.25	0.25

Supplementary Table S7a:

**Self-reported access to technology in 2017
(GDM vs non-GDM respondents aged <40 years)**

Technology	GDM (n=75) Proportion with access	Non-GDM (n=54) Proportion with access	p value
Computer	0.84	0.85	0.85
Tablet	0.79	0.56	0.005
Mobile	0.91	0.91	0.99
Internet access	0.96	0.96	0.95
No technology	0	0	-

Supplementary Table S7b:

**Mobile phone feature utilization in 2017
(GDM vs non-GDM respondents aged <40 years)**

Feature	GDM (n=75) Proportion who utilize feature	Non-GDM (n=54) Proportion who utilize feature	p value
Phone calls	0.84	0.90	0.30
SMS	0.93	0.85	0.11
Mobile internet	0.87	0.89	0.76
Other apps	0.53	0.56	0.79

Supplementary Table S7c:

**Patient comfort with technology and technology-based support in 2017
(GDM vs non-GDM respondents aged <40 years)**

Technology / Tech-based support	GDM (n=75) Proportion reporting comfort	Non-GDM (n=54) Proportion reporting comfort	p value
Technology in General	0.96	0.85	0.06
Technology in diabetes	0.92	0.79	0.04
Email contact from Diabetes Centre	0.91	0.74	0.01
Web-based diabetes Consultation	0.53	0.44	0.35
Online diabetes support group	0.35	0.31	0.66

SUPPLEMENTARY MATERIAL

Supplementary Figure S1

Technology and Diabetes Survey
Diabetes Centre
Royal Prince Alfred Hospital



If you have already done this survey, please inform the staff.
You only need to do it once!

If you do not understand a question or you are not sure of an answer, please leave it blank.

(1) What language do you mainly speak at home?

(2) What is your gender?

- Male Female

(3) In which age group do you belong?

- Under 20 50 to 59
 20 to 29 60 to 69
 30 to 39 70+
 40 to 49

(4) What is the postcode of your home address?

(5) Which of the following devices do you have access to at home? (Tick more than one if necessary)

- Computer (desktop or laptop)
 Printer
 Webcam
 Tablet (iPad or similar)
 Mobile phone
 None of the above


(6) For those who own mobile phones, which features of your mobile phone do you make use of? (Tick more than one if necessary)


- Phone calls
 SMS (Text messaging)
 Mobile internet
 Other applications (eg. games, calendars etc)

(7) What sort of internet connection do you have at home? (Tick more than one if necessary)

- Do not have one
 Have one but don't know which type
 Dial-up
 Wireless USB stick / mobile internet
 ADSL
 Cable
 Satellite
 National Broadband Network fibre to the home

(8) Do you know what these symbols represent?


<input type="radio"/> Yes <input type="radio"/> No


<input type="radio"/> Yes <input type="radio"/> No

(9) Do you search for health information on the internet?
 Yes No

(10) Have you used the Diabetes Australia or ADC website?
 Yes No

(11) Which other diabetes websites do you use?

(12) How comfortable are you with technology in general?

- Not at all comfortable
 A little uncomfortable
 Neither comfortable nor uncomfortable
 Comfortable
 Very comfortable

(13) How comfortable are you with increasing the use of technology in the care of your diabetes?

- Not at all comfortable
 A little uncomfortable
 Neither comfortable nor uncomfortable
 Comfortable
 Very comfortable

(14) Would you be comfortable with your Diabetes Centre contacting you about your diabetes care by email?

- Yes No Undecided

(15) Would you be comfortable with having a diabetes consultation over the internet (using a web camera) with your regular diabetes doctor?

- Yes No Undecided

(16) Would you be interested in joining an online diabetes support group?

- Yes No Undecided

(17) What type of diabetes do you have?

- Type 1 Type 2
 Gestational Don't know

(18) Do you take insulin?

- Yes No

(19) On average, how many times per day do you test your blood sugars at home?

- I do not own a blood glucose meter
 0
 1-2
 3-4
 5 or more

(20) Have you ever connected a glucose meter to a computer to print out your blood sugar readings?

- Yes, at home
 Yes, at the Diabetes Centre
 No

Thank you for completing this anonymous survey. Please hand your completed survey to one of the staff members.