

An evaluation of doctor's experiences with the palliAGEDgp smartphone app

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Abstract

In 2013, the Australian Government funded the I Decision Assist project to improve the delivery of palliative care and advance care planning services to individuals aged over 65 years, through engagement with health professionals working in aged care and primary care.

CareSearch (Flinders University) as a Decision Assist consortium partner was responsible in developing the palliAGEDgp smartphone application (app) as a project deliverable. The app was developed to support general practitioners (GPs) in the provision of palliative care to older Australians living in a residential aged care or community setting. The app content could also be accessed directly through the web, acknowledging that some GPs may prefer access through their office or home computer.

The app was released through the Apple, Android and Windows app stores on 30 April 2015 and promoted nationally, with uptake in both rural and metropolitan settings. Rural GP access to the information on the app was strengthened with the release of a version in 2016 that provided online-offline capacity, allowing the app to be used anywhere in Australia—even in areas where there is no internet coverage.

As at 31 August 2016, there had been 3,542 downloads of the app. In addition, there are over 44 visits to the online palliAGEDgp site made each day.

This study aimed to evaluate how GPs and other specialist physicians, with an interest in palliative care, use the palliAGEDgp app, with the intention of using feedback from users to further improve their virtual within-app experience.

An online survey was developed by a multidisciplinary team. The survey included questions relating to general demographics of the participant, their experience in using apps in the work context and their personal experience with the palliAGEDgp app. GPs and specialist physicians from around Australia were invited to complete the online survey. We used a variety of methods to reach this audience including newsletters and email distribution lists.

This paper will discuss how the palliAGEDgp smartphone app can improve access to clinical support at the bedside, thus increasing the threshold of referral of dying patients to hospices, ambulance services and emergency departments. Based on the challenges we experienced, recommendations are provided for the development of smartphone technology, as a way to extend the reach and distribution of projects for community-based healthcare providers.

Background

The demography of death in the western world has changed, with absolute numbers of patients living with a life-limiting illness increasing annually.¹ This is driven by an ageing population, as well as

developments in both practice and policy within other clinical specialities.² These changes have implications for how systems and communities organise care planning and provision.³

For many patients living with a life-limiting illness, general practitioners (GPs) are well placed to deliver their care.^{4,5} GPs can support a wish to die at home, by putting in place care plans aimed at avoiding unnecessary transfers to hospitals. However, they require a good understanding of clinical practices pertaining to end-of-life care such as management of pain, preparation of advance directives and the provision of support to carers in bereavement.

Processes enhancing a GP's timely access to information around these clinical practices are critical to the delivery of high quality community-based palliative care.⁶ This is particularly important for GPs working in rural and remote settings. With smartphones and their associated applications (apps) being commonplace, they offer an accessible technology to support GPs in caring for people at the end of life.

In 2013, to support health professionals (HPs) working in the primary care or aged care setting with their palliative care caseload, the Australian Government funded the Decision Assist program. Decision Assist aimed to improve the delivery of palliative care and advance care planning services to individuals aged over 65 years, nationally, through the engagement with HPs providing care to older Australians in residential aged or community settings.

In 2014, CareSearch (Flinders University) as a Decision Assist consortium partner developed the palliAGEDgp smartphone application (app). palliAGEDgp aimed to support GPs in providing palliative care, to older Australians in residential aged care or living in the community. The app was built around a "framework of palliative care", based on three prognostic trajectories reflecting the need for advance care planning, case conferencing, and management in the last days of life (terminal care).⁷ The app content can also be accessed directly through the web for those GPs who may prefer to use their office or home computer.

As at 31 August 2016, there had been 3,542 downloads of the app. In addition, there are over 44 visits to the web-based version of palliAGEDgp each day.

This study describes how GPs, with an interest in palliative care, use smartphone apps in the clinical context, with a specific emphasis on evaluating the palliAGEDgp app.

Materials and methods

Table 1 Distribution List For palliAGEDgp Survey

Organisation	Format		
	Newsletter	Email	Twitter
31 Primary Health networks	•		
ACSA	•	•	
13SICK, National Home Doctor		•	
ACRRM	•		
ANZSPM	•		
Austin Health	•		•
Baptist Care	•	•	
BUPA Aged Care	•	•	
CareSearch	•		
Decision Assist	•		•
GPpA	•	•	
LASA	•		
Metro south palliative care service	•	•	
NPS	•		
PCA	•		
Palliverse			•
QUT		•	
RACP—Chapter of Palliative Medicine	•	•	
ACRRM	•		
University of Melbourne—Medical Student Education		•	
UNSW—School of Public Health and Community Medicine		•	
UQ—Primary Care Clinical Unit		•	

ACSA = Aged and Community Services Australia; ACRRM = Australian College of Rural & Remote Medicine; ANZSPM = The Australian & New Zealand Society of Palliative Medicine Inc.; GPpA = GPpartners Australia; LASA = Leading Age Services Australia; NPS = National Prescribing Service; PCA = Palliative Care Australia; RACP = Royal Australasian College of Physicians; UNSW = University of new South Wales; UQ = University of Queensland

Survey development

Survey questions were designed in three components, collecting information relating to:

1. GP demographics
2. usage of healthcare related smartphone apps within the work context
3. experience with the palliAGEDgp smartphone app.

This resulted in a 19-item survey, taking approximately 15 minutes to complete. The survey was made available online, throughout Australia, from 1 December 2016 to 6th March 2017.

Sample recruitment

Approval for the study was granted by the Flinders University Social and Behavioural Research Ethics Committee (project number 7451). A number of state-based and national organisations were approached to distribute the survey (Table 1). Each organisation was offered suggested wording promoting the survey in the format of either a newsletter article, direct email to their membership and/or a twitter message, depending upon the organisation.

In addition, the survey was promoted on the CareSearch and Decision Assist websites.

No incentive was offered to participants or organisations.

Table 2 Relationship of the Remoteness Area (RA) Classification and the categorisation

Code	Descriptor	Categorisation
RA1	Major Cities of Australia	Metropolitan
RA2	Inner Regional Australia	Regional
RA3	Outer Regional Australia	
RA4	Remote Australia	
RA5	Very Remote Australia	

Statistical analysis

All data were collected from the online survey, with surveys needing 50% of the data fields completed to be included within the analysis.

Respondents were categorised into metropolitan or regional postcodes based on the Remoteness Area (RA) Classification system (see Table 2).

Results

In total, 67 respondents had commenced the online survey. Of these, 48 (72%) of the surveys had at least half of the data fields completed and were included within the analysis.

Demographics

Twenty-five (52%) respondents were from metropolitan postcodes, 18 (38%) were from regional postcodes and 5 (10%) left the postcode field blank (Figure 1).

Figure 1 Geographic distribution of respondents

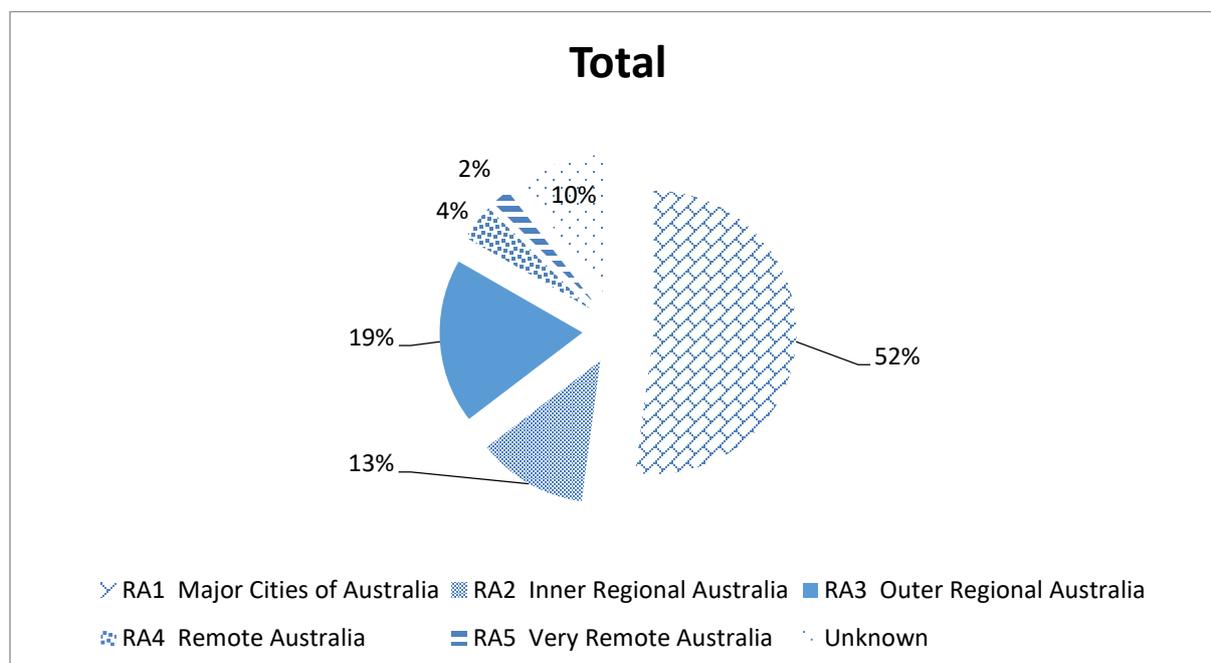


Table 3 describes the demographics of participants in the survey.

Table 3 Demographics

Variable	Metropolitan	Regional	Unknown	Total
Gender, number (%)				
Female	17 (35%)	10 (21%)	3 (6%)	30 (62%)
Male	8 (17%)	8 (17%)	1 (2%)	17 (36%)
Unknown			1 (2%)	1 (2%)
Age, median (range)	51 (29-67)	52.5 (37-70)		
Location, number (%)				
Australian Capital Territory	1 (2%)			1 (2%)
New South Wales	6 (12.5%)	3 (6%)		9 (19%)
Northern Territory		4 (8%)		4 (8%)
Queensland	6 (12.5%)	6 (12.5%)		12 (25%)
South Australia	5 (10%)	1 (2%)		6 (13%)
Tasmania		1 (2%)		1 (2%)
Victoria	6 (12.5%)	2 (4%)		8 (16.5%)
Western Australia	1 (2%)	1 (2%)		2 (4%)
Unknown			5 (10%)	5 (10%)
Workplace Setting, number (%)				
Aboriginal health service		1 (2%)		1 (2%)
Community Health Service		1 (2%)		1 (2%)
General Practice	14 (29%)	12 (25%)	3 (6%)	29 (60%)
Hospital (private)	1 (2%)			1 (2%)
Hospital (public)	9 (19%)	2 (4%)	1 (2%)	12 (25%)
Remote Community Medicine		1 (2%)		1 (2%)
Residential Aged Care Facility	1 (2%)	1 (2%)		2 (4%)
Unknown			1 (2%)	1 (2%)
Specialty, number (%)				
Aged Care	1 (2%)			1 (2%)
General Practice	14 (29%)	15 (30%)	3 (6%)	32 (67%)
Medical Administration		1 (2%)		1 (2%)
Palliative Care	10 (21%)	2 (4%)		12 (25%)
Rural Generalist			1 (2%)	1 (2%)
Unknown			1 (2%)	1 (2%)

Usage of healthcare related smartphone Apps within the work context

The following tables outline views and attitudes around apps and their use and value.

Table 4 describes usage related issues. The iPhone is still the most popular platform. The average number of apps was relatively modest as was the frequency of medical app usage. Over a quarter never use medical applications in their clinical practice. Many workplaces also did not provide complimentary internet access. Table 5 highlights that the most common use of an app was to search the internet.

Table 4 Usage of healthcare related smartphone Apps within the work context

Variable	Metropolitan	Regional	Unknown Location	Total
Smartphone platforms, number (%)				
Android	7 (15%)	3 (6%)	3 (6%)	13 (27%)
iPhone	18 (37.5%)	14 (29%)	2 (4%)	34 (71%)
Other Platform	-	1 (2%)	-	1 (2%)
Complimentary Internet access in the workplace, number (%)				
No	12 (25%)	10 (21%)	4 (8%)	26 (54%)
Yes	12 (25%)	8 (16.5%)	-	20 (42%)
Unsure	1 (2%)	-	1 (2%)	2 (4%)
Median Number of Apps, median (IQR)	3 (1 to 30)	3 (1.25 to 20)		
Frequency medical applications are used, number (%)				
According to need	4 (8%)	4 (8%)	2 (4%)	10 (21%)
Daily	5 (10%)	3 (6%)	1 (2%)	9 (19%)
Weekly	8 (16.5%)	3 (6%)	1 (2%)	12 (25%)
Monthly	2 (4%)	2 (4%)	-	4 (8%)
Never used	6 (12.5%)	6 (12.5%)	1 (2%)	13 (27%)

IQR= interquartile range

Table 5 Frequency of use of various types of apps

Variable	According to need	Daily	Weekly	Monthly	Never used	Blank
Clinical score system/ calculator	9 (19%)	-	13 (27%)	6 (12.5%)	18 (37.5%)	2 (4%)
Disease diagnosis /management	15 (30%)	-	14 (29%)	1 (2%)	16 (33%)	2 (4%)
Documentation	8 (16.5%)	2 (4%)	4 (8%)		32 (67%)	2 (4%)
Internet search	13 (27%)	18 (37.5%)	9 (19%)	-	8 (17%)	-
Medication formulary	10 (21%)	7 (15%)	13 (27%)	2 (4%)	15 (30%)	1 (2%)

The participants identified a large range of apps that could be useful in practice. These are summarised in Table 6.

Table 6 Which specific apps would you recommend?

Recommended App	iOS	Android	Web based version
1min ultrasound	Yes	Yes	No
ALS Handbook	Yes	Yes	Website / Online resource
AMH	No	No	Website / Online resource
ANZCA Opioid calculator	Yes	Yes	No
Australian Prescriber	No	No	Website / Online resource
CliniCalc Medical Calculator	Yes	Yes	Website / Online resource
Doctor Mole Australia	No	No	No
The Doctor's Bag by Australian Prescriber	Yes	Yes	No
ECG Guide [by QxMD]	Yes	Yes	Website / Online resource
Epocrates Reference Tools / Plus	Yes	Yes	Website / Online resource
eTG	Yes	Yes	Website / Online resource
Palliative FastFacts	Yes	Yes	Website / Online resource
GP Pain Help	Yes	Yes	Website / Online resource
iMIMs	Yes	Yes	Website / Online resource
Labgear—Medical Lab Tests and reference	Yes	Yes	No
Liverpool HEP iChart	Yes	Yes	Website / Online resource
MBS Search	Yes	Yes	Website / Online resource
medicalc / medcalX	Yes	Yes	Website / Online resource
medscape	Yes	Yes	Website / Online resource
MindShift	Yes	Yes	Website / Online resource
NEJM This Week / Knowledge+	Yes	Yes	Website / Online resource
Opioid FPM	No	No	Website / Online resource
paediatric dosing calculator	Yes	No	No
Palliaged GP	Yes	Yes	Website / Online resource
patient.co.uk	Yes	No	Website / Online resource
Pradaxa AF	Yes	Yes (Chinese version only)	No
QUIPP	Yes	No	No
qx calculate	No	No	Website / Online resource
RCH clinical guidelines	Yes	Yes	Website / Online resource
resuscitation	Yes	Yes	Website / Online resource
Sam (Self-help Anxiety Management)	Yes	Yes	Website / Online resource
SonicEdu	Yes	Yes	Website / Online resource
SPICT tool	No	No	Website / Online resource
UptoDate	Yes	Yes	Website / Online resource

Tables 7 describe useful features of good apps which indicate the importance of being simple to use, relevant to practice and trustworthy.

Table 7 Useful features of a good application

<ul style="list-style-type: none"> • Best practice guidelines • Clear information • Dosage calculators, and equivalent dose calculators • Drug management • Easy download • Easy searching/navigation • Easy user interface optimised for the phone; • Fast 	<ul style="list-style-type: none"> • Medication protocols and doses, • Patient friendly • Practical • Readable information • Simplicity of use • Up to date • User friendly • Well-structured evidence based information;
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The value of content being held on the phone was highlighted in reported views about the use of apps in the workplace. The ready availability of a phone app when it is needed regardless of location was seen as beneficial while internet and wifi problems and too much emphasis on screens were raised as issues.

Table 8 Issues with using smartphone apps in the workplace

Favourable	Unfavourable
<ul style="list-style-type: none"> • Always to hand • Easy to use, always present • Handy in the field and in the community ...internet can be dodgy • I use it to check opioid conversions but I always do it with a pen and paper as well; • I use a desktop when I can but often need to use the phone for example when visiting a RACF 	<ul style="list-style-type: none"> • Haven't found any useful apps • Don't think to use it • I enjoy not having a phone. It is relaxing. • No work Wi-Fi connected to iPhone • If i had a useful app appropriate for pall care i would use it • Seems unprofessional in a GP setting, online tools are easily accessible • Look at a screen all day • Can't access app when giving advice over the phone, would really like a PBS app. • Apps are still sometimes too complex to find basic information—too much waffle. In the field you just need the information fast. • I do not interact easily with technology! • I use it to answer clinical questions, with difficulty I use the PBS online (not great on the phone and need to log in every time—maybe I haven't set it up properly but it is awful); • I do find it useful but also try not to use in front of patients as i don't think they understand why.

Experience with the palliAGEDgp smartphone App

Sixteen of the 24 respondents had never used the palliAGEDgp app. Of the remaining 24 respondents, did not answer. Seventeen participants provided responses about the app.

Figure 2 Proportion of patients aged 65 years or older

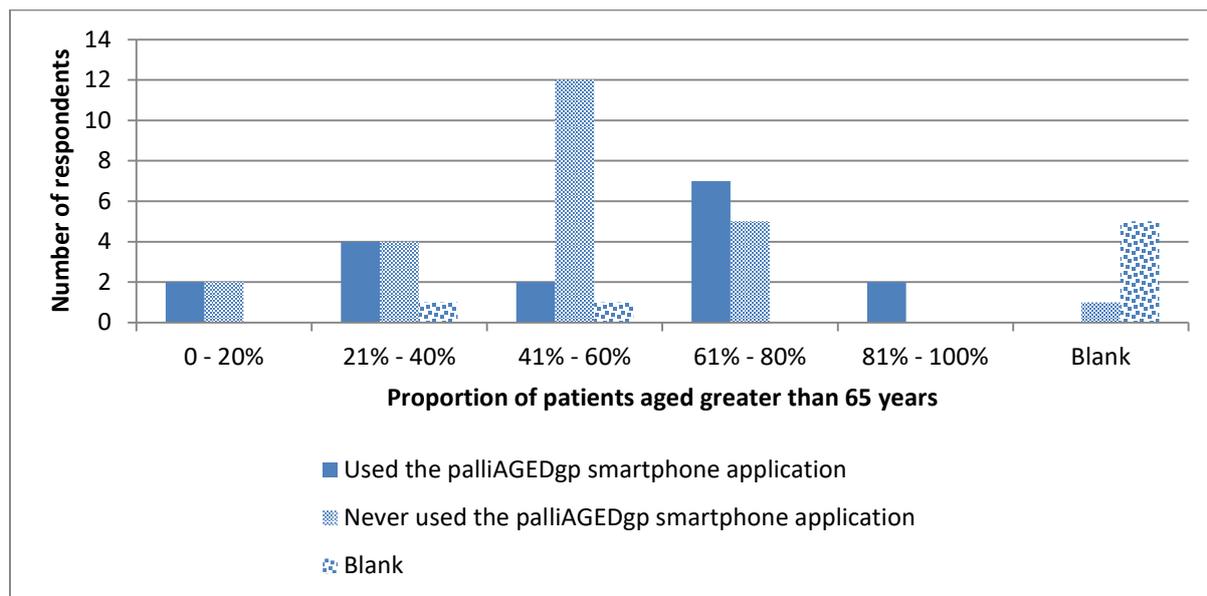
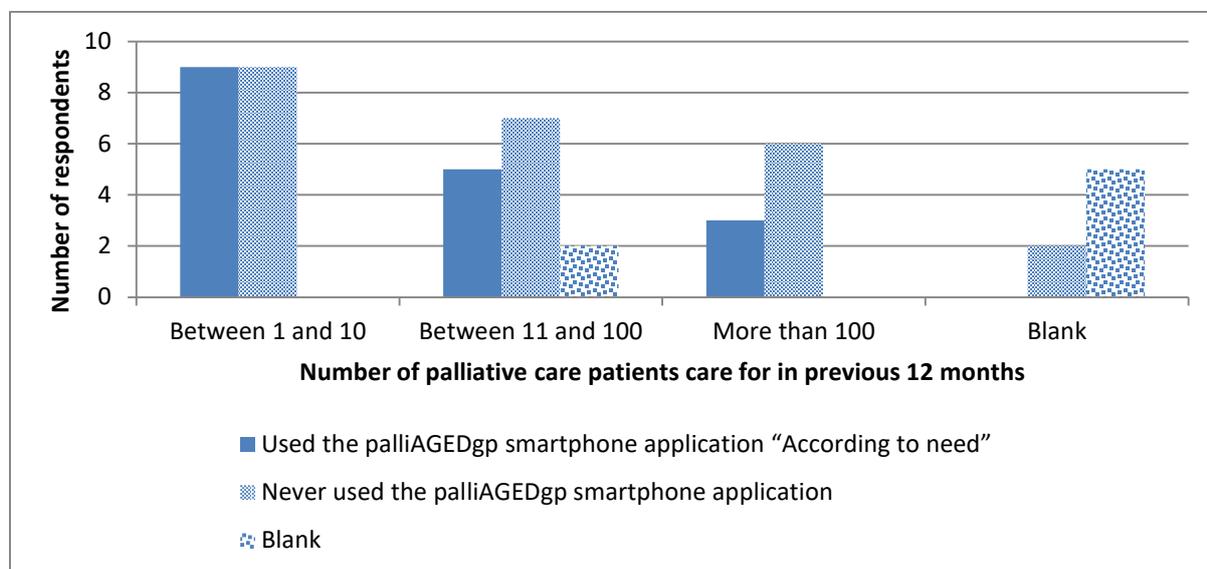


Figure 3 Number of palliative care patients cared for in previous 12 months



The following tables reflect the feedback from respondents indicating that they had used the palliAGEDgp smartphone application. Most found the app could support palliative care practice and found the framework useful.

Table 9 About the palliAGEDgp smartphone application

Statement	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
The palliAGEDgp app guides my support of palliative care	0	1 (6%)	5 (29%)	9 (53%)	2 (12%)
The palliAGEDgp app is easy to use and uncomplicated	0	2 (12%)	5 (29%)	9 (53%)	1 (6%)
The palliative care framework used to structure the information within the application is useful	0	1 (6%)	5 (29%)	11 (65%)	0

Unsurprisingly the most common reason for use was planning for the terminal phase,

Table 10 Most common reason for using the palliAGEDgp smartphone application

Variable	Frequency
Advance Care Planning	1 (6%)
Case conferencing	2 (12.5%)
Planning for the terminal phase of life	13 (81.5%)

A number of improvements were also suggested. Some suggestions were made by GPs who had not yet accessed palliAGEDgp.

Table 11 What else would be useful to include?

Health checklist for terminally ill and aged care patients acceptable modes of drug administration, does it need to be syringe driver?, can butterfly or subcut injection be fine? care for the caregiver
I would like easy access to conversion charts among pain relief medications. I have not seen your app, so don't know if you have included that.
More insight into identifying signs of terminal phase. How to use terminal phase drugs in renal failure.
Quick access to prescribing information
Syringe driver info
The app is off putting as it has so many disclaimers and other text. I actually deleted it from my phone. I think the interface should be improved. I am not the target audience as I am a palliative physician, so my response is not so relevant. I would be really interested to hear if GPs working in aged and palliative care find it useful.

Discussion

The present study provides valuable insights into the use of smartphone health apps by general practitioners and other specialist physicians with an interest in palliative care across Australia. Most respondents used health related smartphone apps to support patient care within their practice. This was mainly to access information about medication formularies, support disease diagnosis and for searching the internet (see Table 5). Of note, about a quarter of respondents never use smartphone apps in the workplace setting. With over half of respondents acknowledging the workplace provides no free WiFi, it is surprising this figure is not higher (Table 4). People may also have a plan that includes data, negating the need for free Wi-Fi.

While iPhone has a substantial portion of the smartphone market, Android users are still significant in numbers. Device agnostic information is crucial if reach is to be maximised. Having apps that work across platforms is important.

While the feedback on the palliAGEDgp smartphone app was favourable, it is important to note that the numbers are low and further feedback may need to be sought to identify the most appropriate improvements. This data indicates the focus of the terminal phase information within the Palliative Care Framework is important and relevant. Inclusion of information pertaining to clinical decisions in the last days of life (for example, links to medicine compatibility in syringe drivers and opioid conversion tables) may be warranted. The palliAGEDgp smartphone app was developed to support the clinician at the bedside. Feedback through this survey indicates that this is important to many clinicians. Interestingly given the emphasis on ACP it was the least commonly sought information through the app. This may reflect that this information is more appropriately accessed from other sources or that it is less important in a direct clinical encounter.

The Australian Government has recognised that primary care is an important partner in palliative care provision in the community.⁸ It has funded a range of programs to assist community-based health professionals (HPs), including CareSearch, an online palliative care resource which incorporates a Nurses Hub, an Allied Health Hub and a GP Hub.⁹ Our data indicates that further targeted investments into the development of smartphone apps supporting GPs clinically are valued. Apps with cumbersome amounts of text, making information difficult to find, will have limited appeal to this market. Responsive design technology may reduce reliance on smart phone applications to make content viewable on phones as responsive design rules will automatically reconfigure content for the device being used by the viewer. This means that apps held on smartphones are more likely to take advantage of the characteristics and functionalities of the smartphone themselves. So rather than simply being purveyor of content, smartphone apps will increasingly be dynamic and function driven. Hence some of the suggestions relating to dosage conversion, interactive health checklist, diagnostic screening tools checked against population norms may be developed that could support clinical decision making.

Limitations and strengths

While the survey was distributed via a range of organisations, the response rate to this survey was poor;. This has been noted before in previous studies surveying GPs.^{10,11} This was despite a genuine and concerted effort to reach the target audience, indicating the intrinsic difficulties in communicating with general practitioners. The low response rate and selection bias are limitations of this study. Those GPs who were more technologically aware may have been more likely to respond.

The strength in this research project is the high proportion of respondents from regional parts of Australia. Technological approaches have been proposed as an important component to improving our health system.¹² Given the remoteness of some workplaces, it is likely that technological advances will have greater impact on the health system in regional parts of the country. Having information about the use and needs of this population will strengthen the implementation of technology interventions for this cohort.

Recommendations

1. Continue to make the palliAGEDgp app available through online app stores and to promote its availability to GPs and to primary care.

2. Continue to maintain the evidence currency of the app
3. Further development of the palliAGEDgp smartphone app to improve navigation and utility.
4. Target GP training organisations when marketing the app.

Conclusion

This evaluation of the palliAGEDgp smartphone app demonstrates interest in supporting GPs to engage in palliative care. Factors that facilitate GPs in using smartphone apps include having a simple interface and ability to access up-to-date information quickly. Recognition of these factors is necessary to enable better implementation of apps into clinical practice. The aspects of care relating to the last days of life also appear to be important components of the palliAGEDgp app.

The complexity of end-of-life care underpins the need for separate funding structures, to develop strategies designed to improve technological advances which are critical to supporting GPs, particularly in the rural and remote setting.

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Presenter

Paul Tait is the Content Editor of the Guidelines and Technological Innovation arm of the Decision Assist Project. His major interest is using technology to increase access to evidence based medicines information for primary care clinicians. The design and development of the palliAGEDgp smartphone app provided a wonderful opportunity to combine his clinical skills with his passion for technology. Paul edits the quarterly Decision Assist Augment Newsletter and writes regularly for the online resource CareSearch. His second job is as a pharmacist within the Southern Adelaide Palliative Services. He is also a keen photographer.