

 Open access • Journal Article • DOI:10.1016/J.SAPHARM.2016.06.010

## **Attitudes and attributes of pharmacists in relation to practice change – A scoping review and discussion — [Source link](#)**

Karen Luetsch

**Institutions:** University of Queensland

**Published on:** 01 May 2017 - Research in Social & Administrative Pharmacy (Elsevier)

**Topics:** Pharmacy practice, Pharmacist and Pharmacy

Related papers:

- [Are Pharmacists the Ultimate Barrier to Pharmacy Practice Change](#)
- [Practice Change in Community Pharmacy: Quantification of Facilitators](#)
- [Implementing cognitive services in community pharmacy: a review of facilitators used in practice change](#)
- [A qualitative assessment of a community pharmacy cognitive pharmaceutical services program, using a work system approach.](#)
- [Making sense of implementation theories, models and frameworks](#)

Share this paper:    

View more about this paper here: <https://typeset.io/papers/attitudes-and-attributes-of-pharmacists-in-relation-to-36nw62nie6>

# Accepted Manuscript

Attitudes and attributes of pharmacists in relation to practice change – a scoping review and discussion

Dr Karen Luetsch

PII: S1551-7411(16)30128-0

DOI: [10.1016/j.sapharm.2016.06.010](https://doi.org/10.1016/j.sapharm.2016.06.010)

Reference: RSAP 762

To appear in: *Research in Social & Administrative Pharmacy*

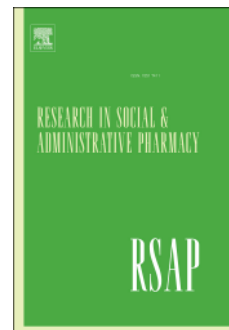
Received Date: 27 February 2016

Revised Date: 1 June 2016

Accepted Date: 18 June 2016

Please cite this article as: Luetsch K, Attitudes and attributes of pharmacists in relation to practice change – a scoping review and discussion, *Research in Social & Administrative Pharmacy* (2016), doi: 10.1016/j.sapharm.2016.06.010.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



**Title Page**

Title of manuscript:

Attitudes and attributes of pharmacists in relation to practice change – a scoping review and discussion

Corresponding and sole author details:

Dr Karen Luetsch

School of Pharmacy

The University of Queensland

20 Cornwall St

Woolloongabba, Qld 4102, Australia

[k.luetsch@uq.edu.au](mailto:k.luetsch@uq.edu.au)

1 **Attitudes and attributes of pharmacists in relation to practice change – a scoping review and**  
2 **discussion**

3 **Abstract:**

4 Background: Multiple barriers and facilitators to the uptake of cognitive services in pharmacy practice  
5 have been identified. Pharmacists' attitudes and attributes have been described as barriers and  
6 facilitators in relation to the uptake of extended pharmacy services, in addition to those of a more  
7 systemic nature.

8 Objectives: To systematically scope and review the literature describing pharmacists' attitudes and  
9 attributes in relation to the implementation of cognitive services or role extension and to critically  
10 analyse and discuss their relevance as barriers or facilitators.

11 Method: A scoping review of the literature on attitudes and attributes of pharmacists in relation to  
12 pharmacy practice was performed, including 47 articles on attitudes and 12 on attributes, forming the  
13 basis for a critical analysis within theoretical frameworks.

14 Results: Pharmacists' attitudes towards role extensions and new pharmacy service models are  
15 generally positive and their personal attributes and personality traits appear favourable for roles as  
16 health professionals. Pharmacists perceived a number of barriers to the uptake of extended roles.

17 Conclusion: Pharmacists' attributes, including personality traits, and attitudes favour the  
18 implementation of cognitive and patient-focused health care services and should not be regarded as  
19 major barriers to the uptake of extended pharmacy practice roles. Framing their attitudes and  
20 attributes within the theories of planned behaviour and personality trait theories indicates that  
21 individual motivation needs to be underscored by systemic support for pharmacy practice change to  
22 succeed on a wide scale.

23 **Keywords:** pharmacist, attitude, attribute, personality trait, cognitive pharmaceutical services,  
24 pharmaceutical care

25 **Introduction:**

26 Pharmacists have had many opportunities to develop their professional role over the last three  
27 decades. By many measures pharmacy as a health profession and a business model has been changing  
28 constantly and with it the practice of individual pharmacists. Like other health professionals  
29 pharmacists have to continuously adapt to changing business and health care models, government  
30 policies and regulations, technology and its application, new diseases and treatments, continuous  
31 changes and updates to treatment and lifestyle guidelines and increased consumer engagement with  
32 healthcare decision-making. In many countries and jurisdictions pharmacists' scope of practice is

33 extending considerably and the supply of medicines role is increasingly moving from the centre of  
34 pharmacists' practice.<sup>1-4</sup>

35 Change and innovation in health professions often relates to the implementation and application of  
36 new technologies or techniques. In pharmacy more advanced technologies assisting in medication  
37 supply, workflow and business management, the outsourcing and specialisation of tasks like  
38 compounding or preparation of dose administration aids, enables pharmacists to become more  
39 involved in other health care activities. A recent workforce survey of pharmacists in the USA showed  
40 that from 2009 to 2014 pharmacists decreased the time devoted to medication dispensing from 55% to  
41 49% and increased their time providing patient care services from 16% to 21%. Time spent on other  
42 activities did not change significantly, 13% was allocated to business and management, 7% to  
43 education, 4% to research and 6% to other activities. Medication Therapy Management (MTM),  
44 which includes a comprehensive, interactive review of medicines, identifying drug interactions and  
45 gaps in medication use, was offered by 60% of community pharmacies. Immunisation services had  
46 been implemented by 53%, and 52% reported monitoring and adjusting of medication therapy to  
47 attain desired outcomes.<sup>4</sup>

48 A number of barriers and facilitators for change in pharmacy practice have been identified, for  
49 example competence and confidence of pharmacists or a lack thereof and public or organisational  
50 support, with a variety of factors exerting influence on the adoption rate of new practice models and  
51 extension of pharmacist roles as health care providers.<sup>5-10</sup> Many of these factors, such as workplace  
52 design, work flow and regulatory requirements, originate from within the system and external  
53 environment pharmacists practice in.<sup>9, 11, 12, 13</sup> Few studies investigated the interventions or actual  
54 process of accomplishing changes in pharmacist behaviour and how these were promoted or  
55 supported.<sup>14</sup> Some barriers to change have been attributed to pharmacists as individuals, with  
56 pharmacists described as reluctant to change their practice to implement novel service models, which  
57 involve more patient contact and clinical responsibility than the supply of medicines.<sup>15</sup>

58 While many pharmacists are extending their professional roles a significant number seems hesitant in  
59 providing novel services and accepting new responsibilities in patient care while the evidence for their  
60 outcome benefits to patients is still emerging.<sup>16, 17</sup> Slow uptake of roles as prescribers, reluctance to  
61 take responsibility for outcomes in patient care and closer involvement with patients has been related  
62 to pharmacists' personal attributes and personality traits as well as to their attitudes and beliefs.<sup>15</sup> The  
63 extent to which pharmacists' individual or personal attributes and attitudes are inhibitors to extending  
64 their roles and whether these are innate or possibly acquired throughout their training,  
65 professionalisation and professional practice warrants consideration. Understanding how attitudes and  
66 attributes or external and systemic factors influence the uptake of wide spread practice change will  
67 potentially guide future implementation strategies for changes to pharmacy practice.

68 This paper provides a critical analysis of recent empirical research examining pharmacists' attitudes  
69 and personal attributes and whether they constitute barriers or facilitators to practice change. In this

70 context attitude can be understood as the degree to which a pharmacist has formed a favourable or  
71 unfavourable evaluation or appraisal of a specific role or cognitive service and attribute as a  
72 psychological characteristic of an individual.<sup>18</sup> The format of a scoping review was chosen as it allows  
73 for mapping a broad range of evidence and the summation of research findings generated by studies  
74 of potentially widely varying designs. It lends itself to providing a narrative overview of a broadly  
75 defined topic and the potential identification of future research opportunities.<sup>19</sup>

76

## 77 **Methodology**

78 A preliminary screen of the literature identified the body of published research into attitudes and  
79 attributes of pharmacists as heterogeneous and mainly qualitative in nature. Thus a scoping review  
80 was chosen as the method of summarising and disseminating the findings of this wide range of  
81 research.<sup>19</sup> A scoping review was also deemed a suitable methodology to accommodate expected  
82 difficulties in determining the inclusion or exclusion of studies due to the broad terms of reference of  
83 the review and the not always unambiguous use of terms of interest, e.g. 'cognitive services', in the  
84 literature.

85 A literature search of MEDLINE, CINAHL via EBSCOhost and PsycINFO databases was performed  
86 with the search terms of pharmaceutical services or care, community pharmacy services, pharmacy or  
87 pharmacies, pharmacist\* as major subject headings or key words, combining results with a search for  
88 attribute\* and attitude\* as text words. The search process was supported by a specialist librarian. The  
89 exact final search strategies are provided in appendix 1. Searches were restricted to publications  
90 written in English and published from 2000-2015. Titles and abstracts were reviewed to identify  
91 studies which described the attributes and attitudes of pharmacists in relation to the implementation of  
92 what would be regarded as cognitive or extended pharmacy services or practice change.<sup>20</sup>

93 Studies were included for review and discussion when they reported on empirical research into the  
94 attitudes or personal attributes of pharmacists and pharmacy students in relation to pharmacy services  
95 which were described as novel, extended or advanced in the respective publication. For inclusion the  
96 cognitive pharmacy services had to be well defined in the article, e.g. supplementary or independent  
97 prescribing, or been clearly defined in the pharmacy literature, e.g. medication therapy management,  
98 pharmaceutical care. In addition studies providing detailed descriptors of the investigated pharmacy  
99 service, with the service entailing a structured, individualised approach to patient care, were included.  
100 Studies into pharmacists' personal attributes had to use a validated psychometric assessment tool.  
101 Inclusion was limited to research conducted within health care systems with similar structures and  
102 governance. Studies from North America, Europe, Australia or New Zealand were chosen to attain an  
103 approximation of similarity in health care systems and regulation and practice of pharmacy, aimed at  
104 limiting heterogeneity and increasing the potential of legitimately generalising the findings.

105 Studies were excluded from the review when pharmacists' attitudes to or attributes in relation to  
106 broadly defined healthcare or unspecified support services were examined, e.g. general health  
107 promotion, as well as some public health services, e.g. disease or addiction screening.

108 Reference lists of included articles and relevant review articles were screened for additional studies.

109 Fig. 1. Flow chart for selecting literature for inclusion in scoping review.

110 [Insert figure 1 here]

111 Screening of the literature made obvious that research into attributes of pharmacists focused on  
112 personality traits. In order to ascertain whether pharmacists exhibit similar or different personality  
113 trait profiles to other health professionals, whose scope of practice is regarded as variable and  
114 extending, the search was widened to permit comparisons of traits. A separate search was performed  
115 to identify research conducted into personality traits of pharmacists and pharmacy students as well as  
116 other health care professionals world-wide. MEDLINE, CINAHL and PsycINFO were searched for  
117 the terms personality, pharmacist\*, medical or medicine, nurs\* and health professional\* within the  
118 date range of 2000-2015. Additional titles and abstracts which indicated investigation of personality  
119 traits in relation to the provision of pharmacy or healthcare services were flagged for full-text retrieval  
120 as well as studies which enabled comparison of personality traits with other health professionals. This  
121 iterative process yielded another 3 articles on pharmacists' personality traits to the review. In total,  
122 screening, article review, iterative and reference searches resulted in the final inclusion of 47 articles  
123 on pharmacists' attitudes and 12 on attributes.

124 Eligible studies were assessed for participant enrolment, pharmacy service or practice model studied,  
125 methodology and major empirical findings.

126 A knowledge synthesis achieved by the scoping review forms the basis of a critical analysis and  
127 discussion of the relevance of attributes and attitudes of individual pharmacists or pharmacy students  
128 in the development or implementation of practice change and new health care service models in  
129 pharmacy.<sup>21</sup> Theory of Planned Behaviour (TPB) and personality trait theories were employed as  
130 theoretical frameworks to inform the discussion of results. TPB was chosen a priori as a framework to  
131 investigate pharmacists' attitudes to changing practice as it links behaviour change to attitudes and  
132 external factors potentially relevant to successful practice change. TPB posits that once beliefs and  
133 attitudes about a certain behaviour are positive, the likelihood of developing an intention to exert the  
134 behaviour increases, with strength of intention consequently predicting the execution of behaviour.<sup>18</sup>

135 Personality trait theory, which contends that human behaviour is strongly influenced by attitudes and  
136 beliefs generated through habitual patterns of thought and emotions, was integrated once it became  
137 clear that research on pharmacists' personal attributes focused on their personality traits.

138

139 **Results**140 *Pharmacists' attitudes towards cognitive services and practice change*

141 A significant number of qualitative or mixed methods studies have evaluated pharmacists' attitudes  
142 towards cognitive services in pharmacy practice and patient care, using mainly surveys, focus groups  
143 and semi-structured interviews. Research describing attitudes and attributes mainly included  
144 community pharmacists but also pharmacists working in other health care settings, e.g. primary care  
145 or hospitals. Appendix 2 tabulates studies which report on pharmacists' attitudes towards the  
146 implementation or delivery of cognitive and extended pharmacy services. Attitudes towards MTM,<sup>22-</sup>  
147 <sup>26</sup> pharmaceutical care<sup>27-31</sup> and medication utilisation reviews<sup>32-36</sup> have been reported. Similarly,  
148 attitudes and intentions to participate in or implement immunisation programs in community  
149 pharmacies<sup>12, 37-40</sup> and the provision of patient-focused services by pharmacists,<sup>8, 41</sup> for example  
150 adherence support<sup>42-44</sup> and chronic disease management<sup>45-47</sup> or other support services,<sup>48, 49</sup> have been  
151 studied. Pharmacist prescribing as either supplementary or independent prescribers has been the focus  
152 of attitude research,<sup>2, 3, 50-61</sup> in addition to pharmacists' integration into health care teams, e.g. primary  
153 care practices.<sup>62-64</sup> Some of these studies also described positive intentions to implement services and  
154 elucidated on barriers and facilitators.<sup>2,22,27,51,64</sup>

155 Studies investigating pharmacists' general attitudes towards extended practice roles concluded that  
156 pharmacists' attitudes and intentions for change were mostly positive, despite perceived barriers in  
157 their organisational environment.<sup>48,65</sup> Pharmacists expressed necessity, willingness or enthusiasm to  
158 extend their roles, though often perceived their external environment creating obstacles to do so.<sup>61</sup>  
159 Positive attitudes and intentions to implementing change or taking up specific new roles were  
160 represented in most of the studies looking at immunisation,<sup>12, 38, 39</sup> pharmacist prescribing,<sup>51-53, 57, 58, 60,</sup>  
161 <sup>61</sup> patient-focused support services,<sup>8, 42-44, 49</sup> medication management or review services<sup>22, 23, 27-29, 33, 34</sup>  
162 and collaboration with other health professions.<sup>63</sup> Positive attitudes were expressed in terms of  
163 perceived benefits for patients,<sup>34, 36, 40, 44, 56, 58, 65</sup> for example the prevention of adverse drug events,<sup>26</sup>  
164 improved access to and continuity of care<sup>2, 51, 55, 61</sup> or improved adherence to medicines.<sup>55</sup> Pharmacists  
165 had positive opinions on how role extensions or novel services would benefit their individual practice  
166 or the pharmacy profession. Advancement of the profession and an increase in professional standing  
167 and role enhancement formed parts of positive attitudes.<sup>25, 30, 34, 38, 54, 56, 60, 65</sup> Pharmacists perceived a  
168 potential or actually experienced an increase in role satisfaction.<sup>40, 43, 44, 52, 57, 61</sup> They also expressed  
169 recognition of how roles beyond medication supply, such as conducting formalised, interactive  
170 medication reviews, would increase the acceptance of pharmacists by other health professionals and  
171 facilitate the integration into health care teams.<sup>36, 55</sup>



172 Pharmacy students also expressed positive beliefs and attitudes towards future roles in clinical and  
173 patient care and motivation to extend their practice. At times these were independent of their level of  
174 skill and competence.<sup>40</sup> They also showed intention to implement immunisation programs at their  
175 future place of work, irrespective of the measure of control they may have to do so in practice.<sup>66</sup>

176 When pharmacists' attitudes and beliefs were correlated to concerns about the implementation of  
177 cognitive services or uptake of an extended role barriers and facilitators which potentially reside with  
178 the individual were identified and described. The need for additional training and competence was  
179 frequently mentioned, particularly in relation to prescribing with a focus on training in diagnosis as  
180 well as assessment and monitoring, and immunisation.<sup>27, 28, 37, 48, 51-53, 58, 65</sup> In some settings  
181 pharmacists perceived a lack of mandate from the public or other health professionals<sup>8, 32</sup> or the need  
182 for more collaborative relationships with other health professionals, particularly physicians.<sup>3, 36, 44</sup> The  
183 most frequently cited barriers to the uptake of any new service were a lack of time to provide patient-  
184 focused services in a busy pharmacy or retail environment and an unsuitable work environment or  
185 work flow, clearly pointing to organisational and environmental issues.<sup>12, 22, 23, 27, 28, 34, 37, 39, 41-43, 53, 60</sup>

#### 186 *Pharmacists' attributes in relation to cognitive services and practice change*

187 Empirical research investigating pharmacists' personal attributes in relation to practice change almost  
188 exclusively explored their 'Big Five' personality traits.<sup>67-78</sup> Appendix 3 provides an overview of the  
189 included studies which used a validated psychometric instrument measuring personal attributes and  
190 traits as well as summarising their key findings .

191 Personal attributes and personality traits are believed to influence the formation of beliefs and  
192 attitudes.<sup>79</sup> They are understood as relatively enduring dispositions, predisposing a person to certain  
193 patterns of thoughts, feelings and influencing how they interact with their environment<sup>79, 80</sup> and are  
194 regarded as reasonably stable across, particularly later, adulthood.<sup>81, 82</sup> In the 1990s consensus  
195 emerged that personality traits can be organised within five broad factors, the 'Big Five', namely  
196 Extraversion, Neuroticism, Openness to Experience/Intellect, Agreeableness, and Conscientiousness.  
197 These five traits, deriving from a number of underlying facets and developed into the Five Factor  
198 Model (FFM), are thought to explain much of the variance in human behaviour.<sup>79</sup> The validity and  
199 utility of the FFM is not without contention. The reduction of variance in complex behaviour to a few  
200 global factors appears simplistic within the socio-cognitive model of human behaviour, where theories  
201 around self-efficacy, self-regulation or goal orientation are offering cogent explanations.<sup>83, 84</sup> A  
202 number of instruments to measure Big Five personality traits have been developed. In common use  
203 are the NEO Five-Factor Inventory (NEO-FFI), the NEO Personality Inventory-Revised (NEO-PI-R)  
204 and the Big Five Inventory (BFI).<sup>85-87</sup>

205 Studies involving pharmacists mainly employed the BFI as an assessment tool, often correlating  
206 results to performance of patient care services like MTM, immunisation or prescribing.<sup>67-72</sup>

207 Participating pharmacists rated higher scores for the FFM traits of conscientiousness and emotional  
208 stability and at least as high or higher for agreeableness than the relevant population average.<sup>88</sup>  
209 Pharmacists expressed varying degrees of extraversion but consistently a lesser degree of openness to  
210 new experiences than the general population. A comparison of the results of these studies with the  
211 limited number of small studies of other health professionals or students using the BFI shows that  
212 participants in the vast majority similarly reported higher degrees of agreeableness, conscientiousness,  
213 emotional stability, varying degrees of extraversion and a lower than average degree of openness to  
214 new experiences compared to population means. Physiotherapists, surgeons, physicians, other doctors,  
215 medical and psychology students all exhibited for example lower than average scores of openness to  
216 experience, mirroring findings from the pharmacist studies.<sup>89-93</sup> The only professional group reaching  
217 the population mean score for this trait was a small group of occupational therapists.<sup>91</sup>

218 Research applying the two other commonly used FFM inventories, the NEO-PI-R or NEO-FFI  
219 instruments, finds slightly different trait profiles for health professionals. The only study applying the  
220 NEO-FFI to pharmacists was conducted in Thailand, rating them high on agreeableness,  
221 conscientiousness, average openness, average to low extraversion and low on neuroticism.<sup>78</sup> The use  
222 of the NEO-PI-R found mixed results with small groups of pharmacy students in Taiwan and  
223 pharmacists in South Africa, which are not easily compared to population means.<sup>76, 77</sup> Most studies  
224 have been conducted within the medical profession and correlated personality traits for example to job  
225 satisfaction,<sup>94</sup> preference for urban or rural practice<sup>95</sup> and patient satisfaction.<sup>96</sup> These as well as  
226 studies involving medical students confirmed the trend of higher than average conscientiousness,  
227 agreeableness and emotional stability but not the findings from research using the BFI of low  
228 openness to experience by practicing or aspiring medical professionals. Studies employing the NEO-  
229 PI-R and NEO-FFI showed doctors and medical students scoring average to high for openness when  
230 reporting the raw or adjusted scores for the personality measures compared to population averages.<sup>97-  
231 <sup>103</sup> Similar results were obtained in studies involving nurses and nursing students.<sup>104-106</sup></sup>

232 Cordina et al. conducted a number of studies using the Gordon Personal Profile Inventory (GPP-I)  
233 with Maltese pharmacists and pharmacy students, investigating personal attributes in relation to  
234 practice.<sup>73-75</sup> Practicing pharmacists showed the highest mean score for responsibility, followed by  
235 vigour, cautiousness and original thinking.<sup>73</sup> First year pharmacy students marked their highest scores  
236 in original thinking, personal relationships, vigour, responsibility, and low scores for self-esteem,  
237 emotional stability and ascendency.<sup>74</sup> In a follow up study after 4 years pharmacy students seemed to  
238 have consolidated their traits on the GPP-I but became more cautious and responsible.<sup>75</sup>

239

## 240 **Discussion**

### 241 *Attitudes*

242 Studies of pharmacists' attitudes towards and opinions about cognitive services and new roles indicate  
243 that they formed mainly favourable evaluations, perceiving many benefits to patients, themselves as  
244 individuals and the profession. Although pharmacists expressed positive attitudes the actual  
245 implementation and provision of cognitive services is often perceived as lacking in practice.<sup>15</sup> Even  
246 when individuals have taken appropriate steps to facilitate the transition from intended to actual new  
247 behaviours the rate of practice change can be limited.<sup>34, 50, 107</sup> Theory of Planned Behaviour (TPB)  
248 offers a useful framework when looking for possible explanations for the gap between pharmacists'  
249 positive beliefs and attitudes and the actual or perceived lack of practice change behaviour.<sup>18</sup> TPB  
250 explains up to 27% of the variance in certain behaviours and up to 39% of the variance in intentions to  
251 action a behaviour, with effect size varying according to behaviour type.<sup>108, 109</sup> Positive beliefs and  
252 attitudes about a certain behaviour increase the likelihood of developing an intention to exert the  
253 behaviour.<sup>18</sup> Other factors influencing intention are subjective norms (SN), which provide permission  
254 or approval, social pressure or a mandate for pharmacists to perform certain professional roles.  
255 Pharmacists also need to feel they have a degree of control over the performance of their intended  
256 behaviours and actions, i.e. that they have the necessary means, ability, skills and competence. This  
257 perceived behavioural control (PBC) is another significant predictor for intention and subsequent  
258 behaviour.<sup>18</sup> For TPB to apply a degree of actual behavioural control needs to be present, which may  
259 not be the case where pharmacists are not the designated decision-makers in their practice setting.  
260 Due to often working within a regulated or structured environment, systemic and organisational  
261 structures may not permit a motivated, well intended and competent individual to start a new  
262 behaviour without organisational or regulatory permission, limiting actual control, as experienced by  
263 pharmacists who obtained prescribing authorisation in the UK.<sup>2, 50</sup>

264 Within this theoretical framework attitudes are generally found to be the strongest predictor variable  
265 for intention, followed by PBC and SN, with intention often regarded a proxy measure for actual  
266 behaviour.<sup>24, 108, 110</sup> It seems that pharmacists and particularly pharmacy students' behavioural beliefs  
267 and attitudes form favourable antecedents to developing intentions to practice in new or extended care  
268 roles.<sup>111</sup> Studies reporting that the presence of positive attitudes to providing MTM or pharmaceutical  
269 care correlates positively to a higher likelihood of providing these services illustrate these theoretical  
270 aspects.<sup>25, 67</sup>

271 Subjective norms can partly support or hinder pharmacists in extending professional roles and scope  
272 of practice. Professional organisations and regulations, academia, existing professional training and  
273 consumer or health professional expectations all create norms which may generate incentives or  
274 disincentives for pharmacists to extend their skills and participate more actively in health care. Some  
275 pharmacy practice studies confirm that SN can be a reliable and strong predictor of intention to  
276 participate or implement a novel pharmacy service.<sup>24, 113, 114</sup> This finding seems to apply particularly

277 when actual and perceived control over the behaviour is high, e.g. with the use of drug monitoring  
278 databases or adverse drug event reporting.<sup>115-117</sup>

279 A pervasive factor influencing SN negatively seems to be a lack of physician support, absence of  
280 established networks and clear acceptance by other health professionals. Physicians often express  
281 uncertainty or ambiguity towards pharmacists' clinical involvement, questioning their legitimacy and  
282 competence in taking up extended roles.<sup>24, 36, 118-122</sup> In order to strengthen SN for pharmacists and ease  
283 the transition from intention to action in many practice areas relationships and networks need to be  
284 established. This seems particularly important where there is an overlap in roles and responsibilities  
285 with other health professions, for example prescribing and immunisation. Many pharmacists have  
286 negotiated these professional boundaries with success.<sup>62, 63</sup> They found that trust and collaboration  
287 between health professions removes barriers to positive recognition of pharmacy services and the  
288 individual providing them,<sup>123-126</sup> and prefer integration into primary and secondary care.<sup>127</sup>  
289 Professional relationships can be encouraged during the training of health professional students, e.g.  
290 by integrating interprofessional education or practice placements with other health professions into  
291 graduate degree programs. These will establish early role clarity, a mutual understanding of  
292 practitioners' skills and abilities and facilitate the negotiation of professional boundaries. Enhancing  
293 pharmacists' interprofessional communication skills alongside their clinical skills will encourage and  
294 support the establishment of collaboration and trust at an individual practitioner level. At the same  
295 time collaboration has to be negotiated between respective professional organisations, who usually  
296 drive the extension of pharmacists' scope of practice but then seem to leave the negotiation of  
297 professional frontiers to practitioners at the coal face.<sup>128</sup>

298 The increasing commercialisation of pharmacy may create another substantial hurdle for pharmacists  
299 due to the actual or perceived conflict of business interests with the provision of health care. The  
300 negative impact this may have on relationships with other health professions and consumers has been  
301 identified in a number of studies on role extension and will potentially influence SN.<sup>35, 47, 126, 129, 130</sup>  
302 Relationships are at the core of healthcare and central to shaping the public's expectations of  
303 pharmacists' role as healthcare providers. Attention to the psychosocial dimensions of their  
304 interactions with consumers in place of a more transactional approach to the practice of pharmacy will  
305 strengthen relationships.<sup>1</sup> This will enable pharmacists to assist people in changing behaviours which  
306 are detrimental to their well-being, extending existing patient care skills to supporting people to take  
307 responsibility for all aspects of their health and health care. Similarly to improving interprofessional  
308 training of pharmacy students involving them in early person contact and participation in patient-  
309 focused and cognitive services can facilitate the development of an identity as carer. This would also  
310 broaden the understanding of those who are attracted to pharmacy by its connotations of a science  
311 based profession. Many pharmacists have already seized the opportunities to introduce patient-  
312 focused health services, portraying their role and image as health carers more explicitly, without

313 having to rely on funding or regulatory approval. Pharmacists and pharmacies offer unfunded and  
314 funded services which are supporting the goals of primary health care in disease prevention and  
315 chronic disease management, e.g. in promoting smoking cessation and lifestyle changes or asthma  
316 management.<sup>14</sup> Ensuring pharmacy services are delivered to a high standard and technical quality will  
317 raise consumer and health professional expectations, reinforcing SN. An improvement of their  
318 functional quality is likely to strengthen the perception of pharmacists as carers and clinicians. For  
319 pharmacists to consistently succeed in their obligations and ambitions actual and perceived  
320 behavioural control will be necessary.

321 PBC is another strong predictor of positive intentions in pharmacy practice studies employing TPB as  
322 a framework, although not as strong as described in literature on health behaviour,<sup>112, 114</sup> and has been  
323 found a predictor for the likelihood of providing pharmaceutical care.<sup>69</sup> Pharmacists with positive  
324 attitudes often cite barriers in relation to workload and work environment which as well as  
325 competence, skill and need for training all link to PBC. While necessary competence and skill for  
326 extended or novel roles can be gained by individuals either during their graduate training or  
327 continuing professional development, barriers in their work environment are not as easily removed by  
328 the majority of pharmacists. Figure 2 summarises how TPB frames pharmacists' attitudes, facilitators  
329 and barriers to role extension as described in the literature.

330 Pharmacy business models have changed over the last decades but changes in physical environments,  
331 e.g. in community pharmacies, are only slowly creating conditions which are conducive to conducting  
332 patient-focused, clinical consultations.<sup>7</sup> This slow transformation potentially feeds the public's  
333 perception of pharmacies operating mainly as a business rather than a healthcare centre. Research into  
334 how to optimise work flow, work place design and staffing levels to facilitate regular performance of  
335 relationship-based, individualised services would assist pharmacy as a profession and pharmacists as  
336 individuals in extending their roles into many areas of healthcare. Addressing environmental and  
337 organisational factors which create difficulties for motivated pharmacists to fully participate in  
338 cognitive service provision and strengthening their PBC should increase pharmacists' chances to  
339 succeed in taking on new roles as discussed, for example, by Farris et al.<sup>131</sup>

340 Figure 2. Attitudes, facilitators and barriers described by pharmacists within the Theory of Planned  
341 Behaviour

342 [Insert figure 2 here]

### 343 *Personal Attributes*

344 Research into pharmacists' attributes in relation to cognitive pharmacy services focused mainly on  
345 their personality traits. When measured with the BFI, a FFM instrument, pharmacists and other health  
346 professionals in comparison to the population average rated scores which were higher for the traits of

347 conscientiousness and emotional stability, average to higher for agreeableness, lower to higher for  
348 extraversion and lower for openness to experience.<sup>67-72, 89-93</sup> Within the FFM higher degrees of  
349 conscientiousness have been established as predictors for job and academic performance, with  
350 extraversion seemingly relevant for success in sales and management. When jobs rely on  
351 interpersonal interaction, like team work, agreeableness and emotional stability seem to be more  
352 important for success, but other traits have not been proven to be reliable predictors of people's  
353 performance or behaviour on the job.<sup>132-134</sup> Although correlations were not established with all FFM  
354 instruments, higher degrees of extraversion and openness are often linked to people being less  
355 conventional, and openness in particular to creativity, innovativeness and divergent thinking.<sup>135, 136</sup>  
356 These findings may lead to conclusions that pharmacists' personality traits, particularly a low degree  
357 of openness to new experiences, may constitute barriers to the implementation of innovative practice  
358 change. On the other hand Rosenthal et al., studying early adopters obtaining additional prescribing  
359 authorisation in Canada, found they rated similarly in their BFI measured personality profile as  
360 pharmacists in their previous studies. Even these early adopter pharmacists showed a lower rating  
361 than the population mean for the trait of openness with the BFI and thus no definite link of this trait to  
362 an early interest in an extended scope of practice.<sup>70</sup> A recent meta-analysis investigating the degree of  
363 openness in relation to adaptive performance also confirms no significant correlation.<sup>137</sup>

364 Direct comparisons of studies with health professional participants using varying 'Big Five'  
365 instruments are difficult as definitions of traits are slightly but significantly different, emphasising  
366 distinctive facets underlying each trait. For example the NEO-FFI defines extraversion with an  
367 emphasis on positive emotions and warmth, having less focus on assertiveness compared to the BFI.<sup>87</sup>  
368 There are divergent reports on how much the BFI, the NEO-PI-R and NEO-FFI (a shorter version  
369 derived from the NEO-PI-R) correlate and converge for all five traits.<sup>138, 139</sup> Convergence between the  
370 BFI and NEO-PI-R for some traits (i.e. agreeableness and openness) was poor in a large study with  
371 participants from 56 nations.<sup>138</sup> The BFI and NEO-FFI have also shown only moderate convergence  
372 for the trait of openness. A direct comparison of scores between studies using different instruments is  
373 thus inappropriate. The best approximation when comparing different studies would be using  
374 conclusions about group differences to population means established with the respective instrument.<sup>87</sup>

375 Research applying the NEO-PI-R or NEO-FFI instruments with pharmacists, other health  
376 professionals and students often found an average to higher than average degree of openness, while  
377 confirming trends for the other traits.<sup>77, 78, 97-103</sup> This divergence of results obtained from studies using  
378 the BFI may be associated with the way the BFI measures openness, possibly not providing a good  
379 model fit for people who become or are health professionals. The BFI measures openness by an  
380 underlying facet profile which asks three out of ten questions around interests in artistic and aesthetic  
381 experiences.<sup>87</sup> These may have poor validity in those whose curiosity and inventiveness is potentially  
382 focused on scientific and technological innovations and applications. The BFI may consistently

383 underestimate health professionals' openness to experience compared to the other two commonly  
384 used FFM instruments.<sup>136</sup> In the absence of additional pharmacist studies using the instruments more  
385 frequently employed in other health professional research it remains unclear whether pharmacists in  
386 western societies are the only health profession which would consistently maintain lower scores for  
387 the trait of openness compared to population averages and other health professionals if their  
388 personality was measured by the use of the NEO-FFI or NEO-PI-R.

389 An argument against the probability of this scenario can be found in the studies conducted by Cordina  
390 et al., using the Gordon Personal Profile Inventory (GPP-I).<sup>73-75</sup> Results obtained with the GPP-I are  
391 not directly comparable with FFM instruments as they provide information on personality based  
392 competencies, structured into four domains of interests, work style, preferences and work values.  
393 Pharmacy students showed high scores in original thinking, which seemed to decrease slightly  
394 between the first and fifth year of their degree. High scores for original thinking are deemed to signify  
395 people who are intellectually curious, creative innovators and like to work on difficult problems,  
396 which seemingly correlates well to openness to new experience within the FFM.<sup>140</sup> These findings,  
397 though limited in their singularity, support the argument that pharmacists' low openness may well be  
398 an artefact of the use of the BFI as a measurement instrument when considering the studies on  
399 pharmacists' personalities which have shaped understanding until now.

400 Cordina et al. studies hint at pharmacists exhibiting a degree of cautiousness and a dislike of  
401 uncertainty,<sup>73-75</sup> which has also been proposed by others,<sup>141, 142</sup> but they do raise the question whether  
402 pharmacy students commence their studies with these attributes or whether they develop them  
403 throughout their training and professionalisation. The ability to practice with accuracy and correctness  
404 is regarded as probably the most important professional attribute of a pharmacist, with potential  
405 serious consequences for errors in what for many is still a core activity, dispensing.<sup>130</sup> A need for  
406 certainty and precision is predictable when demands from the profession and public permit little  
407 tolerance for errors but is not easily reconciled with uncertainty in clinical decision making in  
408 extended practice roles. Training and professionalisation may well encourage the development of  
409 these attributes.<sup>142-145</sup> Currently it remains uncertain to what degree pharmacists' cautiousness and  
410 discomfort with uncertainty are innate personal attributes rather than products of training, professional  
411 socialisation and norms. Further research into how pharmacists professionalise in comparison to other  
412 health professionals, who seem to be more at ease when making decisions under uncertainty but  
413 exhibit similar personality traits, may shed light onto how and when pharmacy students or  
414 pharmacists acquire these attributes.

415 In summary, pharmacists' attitudes and intentions towards role extensions and potential practice  
416 change appear generally positive. Empirical findings published within the last 15 years show that it is  
417 unlikely that pharmacists' personality traits or personal attributes create major barriers to extensions

418 of current roles into patient-focused services. They indicate that people who are or become  
419 pharmacists should be well suited to a wide range of health professional roles. Pharmacists display  
420 similar personality trait patterns to other health professionals and could be expected to exhibit  
421 behaviours which are conducive for roles in health care. Like in other health professions, pharmacists  
422 with certain personality profiles may be drawn to and succeed in particular roles within their  
423 profession.<sup>74, 76</sup> Surgeons or psychiatrists on average tend to differ slightly in their personality from  
424 their peers but a correlation between a certain personality profile and high performance in these roles  
425 has not been established.<sup>90, 146, 147</sup>

426 Younger generations of pharmacists in particular seem to possess attributes and attitudes favourable to  
427 adapting to future practice changes and patient-focused health care.<sup>56, 75, 142</sup> They often report feeling  
428 let down though by the educational system, realities of pharmacy practice and professional  
429 organisations when trying to realise the potential they perceive for their chosen profession.<sup>144, 148, 149</sup>  
430 Pharmacy training programs can provide assistance in ensuring students complete their degree fit for  
431 extended practice. Strengthening SN by increasing collaboration with other health professions and  
432 consumers, with the aim of integrating pharmacy universally into team based care, will over time  
433 reduce potential scope of practice gaps when transitioning from student to health professional. When  
434 pharmacists perceive customers, patients and other health professionals giving them a mandate or  
435 expecting pharmacists to provide cognitive services in addition to the more traditional roles of  
436 medication supply cognitive dissonance between positive attitudes and SN will weaken. In addition  
437 optimising work flow and practice design to advance patient centred consultations may also mitigate a  
438 potential lack of actual control for those with good intentions which are not translated into planned  
439 behaviour and increase perceived behavioural control in changing practice.<sup>2, 50, 131</sup> At the same time  
440 acceptance that taking on new roles may seem more important to professional organisations or  
441 business owners concerned with pharmacy's obsolescence than to individual, mature practitioners  
442 who feel competent and content within their current scope of practice could direct future research into  
443 addressing systemic issues which may impede practice change in pharmacy.<sup>150</sup>

444 There are a number of limitations to this review. Searches were restricted to the English language and  
445 a defined geographical area, it is acknowledged that a small number of potentially relevant studies has  
446 been conducted in other areas, although within dissimilar health care systems. As cognitive, advanced  
447 or extended services in pharmacy practice are not always clearly defined in the research literature  
448 potentially relevant articles may have been missed, although the broad search strategies were aimed at  
449 keeping a wide focus. Care was taken that the exact nature of the pharmacy service under discussion  
450 was described to pharmacist participants in the included studies, but it was impossible to assess the  
451 degree of their understanding and awareness to ensure they were able to form well-informed beliefs  
452 and attitudes.



453 **Concluding remarks**

454 This review of literature that explores pharmacists' beliefs, attitudes, intentions and attributes  
455 concludes that people who are or are becoming pharmacists are well suited for a career as health  
456 professionals. Research demonstrates their positive attitudes and intentions towards the extension of  
457 their scope of practice, uptake of cognitive and patient-focused pharmacy service models and greater  
458 involvement in health care.

459 While individual pharmacists who chose to extend their scope of practice and ensure they are skilled  
460 and competent to do so can take more responsibility in initiating and building relationships with other  
461 health professionals and they will need support in strengthening subjective norms through the  
462 increasing acceptance of new pharmacist roles by the people they work with or serve. In preference to  
463 tasking individuals with closing any knowledge, attitude, practice gaps systemic issues in pharmacy  
464 practice and service delivery need to be addressed. These may be complex and difficult, but  
465 continuing to resolve them will ease the efforts of motivated pharmacists to practice to the maximum  
466 scope of their ability and competence. Pharmacists seem to exhibit attitudes and attributes which  
467 favour their involvement in a wide range of health care services and adoption of a practice philosophy  
468 of direct patient care but ongoing systemic change is required to facilitate wide-spread extensions of  
469 pharmacists' scope of practice.

470

471 **References:**

- 472 1. McMillan SS, Wheeler AJ, Sav A, et al. Community pharmacy in Australia: a health hub  
473 destination of the future. *Res Soc Admin Pharm* 2013;9:863-875.
- 474 2. Dawoud D, Griffiths P, Maben J, Goodyer L, Greene R. Pharmacist supplementary  
475 prescribing: a step toward more independence? *Res Soc Admin Pharm* 2011;7:246-256.
- 476 3. Weiss MC, Sutton J, Adams C. *Exploring innovation in pharmacy practice: A qualitative*  
477 *evaluation of supplementary prescribing by pharmacists*: Royal Pharmaceutical Society of  
478 Great Britain. London; 2006.
- 479 4. Gaither CA, Doucette WR, Kreling DH, Mott DA. 2014 National Pharmacy Workforce  
480 Survey. Minnesota: Pharmacy Workforce Centre; 2015.
- 481 5. Roberts AS, Benrimoj SI, Chen TF, Williams KA, Aslani P. Practice change in community  
482 pharmacy: quantification of facilitators. *Ann Pharmacother* 2008;42:861-868.
- 483 6. Roberts AS, Benrimoj SI, Chen TF, Williams KA. Implementing cognitive services in  
484 community pharmacy: a review of models and frameworks for change. *Int J Pharm Pract*  
485 2006;14:105-113.
- 486 7. Doucette WR. Organizational factors influencing pharmacy practice change. *Res Soc Admin*  
487 *Pharm* 2012;8:274-284.
- 488 8. Eades CE, Ferguson JS, O'Carroll RE. Public health in community pharmacy: a systematic  
489 review of pharmacist and consumer views. *BMC Public Health* 2011;11:582-592.
- 490 9. Doucette WR, Koch YD. An exploratory study of community pharmacy practice change. *J*  
491 *Am Pharm Assoc* 2000;40:384-391.

- 492 10. Gastelurrutia M, Benrimoj SIC, Castrillon C, de Amezua MC, Fernandez-Llimos F, Faus M.  
493 Facilitators for practice change in Spanish community pharmacy. *Pharm World Sci*  
494 2009;31:32-39.
- 495 11. Roberts AS, Benrimoj SI, Chen TF, Williams KA, Aslani P. Implementing cognitive services  
496 in community pharmacy: a review of facilitators used in practice change. *Int J Pharm Pract*  
497 2006;14:163-170.
- 498 12. Kamal KM, Madhavan SS, Maine LL. Pharmacy and immunization services: pharmacists'  
499 participation and impact. *J Am Pharm Assoc* 2003;43:470-482.
- 500 13. Hopp TR, Sørensen EW, Herborg H, Roberts AS. Implementation of cognitive  
501 pharmaceutical services (CPS) in professionally active pharmacies. *Int J Pharm Prac*  
502 2005;13:21-31.
- 503 14. Patwardhan PD, Amin ME, Chewing BA. Intervention research to enhance community  
504 pharmacists' cognitive services: a systematic review. *Res Soc Admin Pharm* 2014;10:475-493.
- 505 15. Rosenthal M, Austin Z, Tsuyuki RT. Are pharmacists the ultimate barrier to pharmacy  
506 practice change? *Can Pharm J* 2010;143:37-42.
- 507 16. Mossialos E, Naci H, Courtin E. Expanding the role of community pharmacists: policymaking  
508 in the absence of policy-relevant evidence? *Health Policy* 2013;111:135-148.
- 509 17. Blalock SJ, Roberts AW, Lauffenburger JC, Thompson T, O'Connor SK. The effect of  
510 community pharmacy-based interventions on patient health outcomes: a systematic review.  
511 *Med Care Res Rev* 2013;70:235-266.
- 512 18. Ajzen I. The theory of planned behavior. *Organ Behav Hum Decis Process* 1991;50:179-211.
- 513 19. Arksey H, O'Malley L. Scoping studies: towards a methodological framework. *Int J Soc Res*  
514 *Methodol* 2005;8:19-32.
- 515 20. Moullin JC, Sabater-Hernández D, Fernandez-Llimos F, Benrimoj SI. Defining professional  
516 pharmacy services in community pharmacy. *Res Soc Admin Pharm* 2013;9:989-995.
- 517 21. Colquhoun HL, Levac D, O'Brien KK, et al. Scoping reviews: time for clarity in definition,  
518 methods, and reporting. *J Clin Epidemiol* 2014;67:1291-1294.
- 519 22. Blake KB, Madhavan SS, Scott VG, Elswick BLM. Medication therapy management services  
520 in West Virginia: pharmacists' perceptions of educational and training needs. *Res Soc Admin*  
521 *Pharm* 2009;5:182-188.
- 522 23. Law AV, Okamoto MP, Brock K. Ready, willing, and able to provide MTM services?: A  
523 survey of community pharmacists in the USA. *Res Soc Admin Pharm* 2009;5:376-381.
- 524 24. Herbert KE, Urmie JM, Newland BA, Farris KB. Prediction of pharmacist intention to  
525 provide Medicare medication therapy management services using the theory of planned  
526 behavior. *Res Soc Admin Pharm* 2006;2:299-314.
- 527 25. Shah B, Chawla S. A needs assessment for development and provision of medication therapy  
528 management services in New York City. *J Pharm Prac* 2011;24:339-344.
- 529 26. MacIntosh C, Weiser C, Wassimi A, et al. Attitudes toward and factors affecting  
530 implementation of medication therapy management services by community pharmacists. *J Am*  
531 *Pharm Assoc* 2009;49:26.
- 532 27. Dunlop J, Shaw J. Community pharmacists' perspectives on pharmaceutical care  
533 implementation in New Zealand. *Pharm World Sci* 2002;24:224-230.
- 534 28. Liekens S, Smits T, Laekeman G, Foulon V. Pharmaceutical care for people with depression:  
535 Belgian pharmacists' attitudes and perceived barriers. *Int J Clin Pharm* 2012;34:452-459.
- 536 29. Cates ME, Burton AR, Woolley TW. Attitudes of pharmacists toward mental illness and  
537 providing pharmaceutical care to the mentally ill. *Ann Pharmacother* 2005;39:1450-1455.

- 538 30. Montgomery AT, Kalvemark-Sporrong S, Henning M, Tully MP, Kettis-Lindblad A.  
539 Implementation of a pharmaceutical care service: prescriptionists', pharmacists' and doctors'  
540 views. *Pharm World Sci* 2007;29:593-602.
- 541 31. Amsler MR, Murray MD, Tierney WM, et al. Pharmaceutical care in chain pharmacies:  
542 beliefs and attitudes of pharmacists and patients. *J Am Pharm Assoc* 2001;41:850-855.
- 543 32. Bryant L, Coster G, McCormick R. Community pharmacist perceptions of clinical medication  
544 reviews. *J Prim Health Care* 2010;2:234.
- 545 33. Harding G, Wilcock M. Community pharmacists' perceptions of medicines use reviews and  
546 quality assurance by peer review. *Pharm World Sci* 2010;32:381-385.
- 547 34. Latif A, Boardman H. Community pharmacists' attitudes towards medicines use reviews and  
548 factors affecting the numbers performed. *Pharm World Sci* 2008;30:536-543.
- 549 35. McDonald R, Cheraghi-Sohi S, Sanders C, Ashcroft D. Professional status in a changing  
550 world: The case of medicines use reviews in English community pharmacy. *Soc Sci & Med*  
551 2010;71:451-458.
- 552 36. Bradley F, Wagner AC, Elvey R, Noyce PR, Ashcroft DM. Determinants of the uptake of  
553 medicines use reviews (MURs) by community pharmacies in England: a multi-method study.  
554 *Health Policy* 2008;88:258-268.
- 555 37. Valiquette JR, Bédard P. Community pharmacists' knowledge, beliefs and attitudes towards  
556 immunization in Quebec. *Can J Public Health* 2015;106:e89-e94.
- 557 38. Pace AC, Flowers SK, Hastings JK. Arkansas community pharmacists' opinions on providing  
558 immunizations. *J Pharm Prac* 2010;23:496-501.
- 559 39. Aldrich S, Sullivan D. Assessing Pharmacists' Attitudes and Barriers Involved with  
560 Immunizations. *Innov Pharm* 2014;5:Article 154.
- 561 40. Marcum ZA, Maffeo CM, Kalsekar I. The impact of an immunization training certificate  
562 program on the perceived knowledge, skills and attitudes of pharmacy students toward  
563 pharmacy-based immunizations. *Pharm Pract* 2010;8:103-108.
- 564 41. O'Connor M, Hewitt LY, Tuffin PHR. Community pharmacists' attitudes toward palliative  
565 care: an Australian nationwide survey. *J Palliat Med* 2013;16:1575-1581.
- 566 42. Mansoor SM, Aslani P, Krass I. Pharmacists' attitudes and perceived barriers to provision of  
567 adherence support in Australia. *Int J Clin Pharm* 2014;36:136-144.
- 568 43. Lowrie R, Johansson L, Forsyth P, Bryce SL, McKellar S, Fitzgerald N. Experiences of a  
569 community pharmacy service to support adherence and self-management in chronic heart  
570 failure. *Int J Clin Pharm* 2014;36:154-162.
- 571 44. Wells KM, Thornley T, Boyd MJ, Boardman HF. Views and experiences of community  
572 pharmacists and superintendent pharmacists regarding the New Medicine Service in England  
573 prior to implementation. *Res Soc Admin Pharm* 2014;10:58-71.
- 574 45. Puspitasari HP, Aslani P, Krass I. Australian community pharmacists' awareness and practice  
575 in supporting secondary prevention of cardiovascular disease. *Int J Clin Pharm*  
576 2013;35:1218-1228.
- 577 46. Emmerton LM, Smith L, LeMay KS, et al. Experiences of community pharmacists involved  
578 in the delivery of a specialist asthma service in Australia. *BMC Health Serv Res* 2012;12:164.
- 579 47. Rieck A, Pettigrew S. How physician and community pharmacist perceptions of the  
580 community pharmacist role in Australian primary care influence the quality of collaborative  
581 chronic disease management. *Qual Prim Care* 2013;21:105-111.
- 582 48. Schweizer AK, Hughes CM. Providing pharmacy services to care homes in Northern Ireland:  
583 a survey of community pharmacists' views. *Pharm World Sci* 2004;26:346-352.
- 584 49. Um IS, Armour C, Krass I, Gill T, Chaar BB. Managing obesity in pharmacy: the Australian  
585 experience. *Pharm World Sci* 2010;32:711-720.

- 586 50. Tully M, Latif S, Cantrill J, Parker D. Pharmacists' changing views of their supplementary  
587 prescribing authority. *Pharm World Sci* 2007;29:628-634.
- 588 51. George J, Pflieger D, McCaig D, Bond C, Stewart D. Independent prescribing by pharmacists:  
589 a study of the awareness, views and attitudes of Scottish community pharmacists.  
590 *Pharm World Sci* 2006;28:45-53.
- 591 52. Hoti K, Sunderland B, Hughes J, Parsons R. An evaluation of Australian pharmacist's  
592 attitudes on expanding their prescribing role. *Pharm World Sci* 2010;32:610-621.
- 593 53. Hobson RJ, Sewell GJ. Risks and concerns about supplementary prescribing: survey of  
594 primary and secondary care pharmacists. *Pharm World Sci* 2006;28:76-90.
- 595 54. Hutchison M, Lindblad A, Guirguis L, Cooney D, Rodway M. Survey of Alberta hospital  
596 pharmacists' perspectives on additional prescribing authorization. *Am J Health Syst Pharm*  
597 2012;69:1983-1992.
- 598 55. McCann L, Haughey S, Parsons C, et al. Pharmacist prescribing in Northern Ireland: a  
599 quantitative assessment. *Int J Clin Pharm* 2011;33:824-831.
- 600 56. McIntosh T, Munro K, McLay J, Stewart D. A cross sectional survey of the views of newly  
601 registered pharmacists in Great Britain on their potential prescribing role: a cautious  
602 approach. *Br J Clin Pharmacol* 2012;73:656-660.
- 603 57. Lloyd F, Hughes CM. Pharmacists' and mentors' views on the introduction of pharmacist  
604 supplementary prescribing: a qualitative evaluation of views and context. *Int J Pharm Pract*  
605 2007;15:31-37.
- 606 58. Warchal S, Brown D, Tomlin M, Portlock J. Attitudes of successful candidates of  
607 supplementary prescribing courses to their training and their extended roles. *Pharm J*  
608 2006;276:348-352.
- 609 59. Hoti K, Hughes J, Sunderland B. Expanded prescribing: a comparison of the views of  
610 Australian hospital and community pharmacists. *Int J of Clin Pharm* 2013;35:469-475.
- 611 60. Stewart DC, George J, Pflieger DE, et al. Pharmacist supplementary prescribing training: a  
612 study of pharmacists' perceptions and planned participation *Int J Pharm Pract* 2007;15:319-  
613 325.
- 614 61. Stewart DC, George J, Bond CM, Diack HL, McCaig DJ, Cunningham S. Views of  
615 pharmacist prescribers, doctors and patients on pharmacist prescribing implementation. *Int J*  
616 *Pharm Pract* 2009;17:89-94.
- 617 62. Dobson RT, Taylor JG, Henry CJ, et al. Taking the lead: community pharmacists' perception  
618 of their role potential within the primary care team. *Res Soc Admin Pharm* 2009;5:327-336.
- 619 63. Freeman C, Cottrell WN, Kyle G, Williams I, Nissen L. Integrating a pharmacist into the  
620 general practice environment: opinions of pharmacist's, general practitioner's, health care  
621 consumer's, and practice manager's. *BMC Health Serv Res* 2012;12:229.
- 622 64. Demik DE, Vander Weg MW, Lundt ES, Coffey CS, Ardery G, Carter BL. Using theory to  
623 predict implementation of a physician-pharmacist collaborative intervention within a practice-  
624 based research network. *Res Soc Admin Pharm* 2013;9:719-730.
- 625 65. Jorgenson D, Lamb D, MacKinnon NJ. Practice change challenges and priorities: A national  
626 survey of practising pharmacists. *Can Pharm J* 2011;144:125-131.
- 627 66. Luthin DR, King SR, Wensel TM, Rosser AN, Monk-Tutor MR. Relationship between  
628 pharmacy students' knowledge about, attitudes toward, and intention to provide pharmacy-  
629 based immunization services. *Curr Pharm Teach Learn* 2011;3:171-177.
- 630 67. Kittisopee T. *The influences of personality, social cognition, and environmental factors on*  
631 *pharmaceutical care*. USA, ProQuest Information & Learning; 2002.

- 632 68. Hall J, Rosenthal M, Family H, Sutton J, Hall K, Tsuyuki RT. Personality traits of hospital  
633 pharmacists: toward a better understanding of factors influencing pharmacy practice change.  
634 *Can J Hosp Pharm* 2013;66:289.
- 635 69. Rosenthal M, Houle SKD, Eberhart G, Tsuyuki RT. Prescribing by pharmacists in Alberta  
636 and its relation to culture and personality traits. *Res Soc Admin Pharm* 2015;11:401-411.
- 637 70. Rosenthal M, Tsao NW, Tsuyuki RT, Marra CA. Identifying relationships between the  
638 professional culture of pharmacy, pharmacists' personality traits, and the provision of  
639 advanced pharmacy services. *Res Soc Admin Pharm* 2016;12:56-67.
- 640 71. Rosenthal M, Sutton J, Austin Z, Tsuyuki RT. Relationship between personality traits and  
641 pharmacist performance in a pharmacy practice research trial. *Can Pharm J* 2015;148:209.
- 642 72. Rosenthal M, Hall KW, Bussi eres J-F, Tsuyuki RT. Professional culture and personality traits  
643 of hospital pharmacists across Canada: a fundamental first step in developing effective  
644 knowledge translation strategies. *Can J Hosp Pharm* 2015;68:127-135.
- 645 73. Cordina M, Lauri M-A, Lauri J. Career paths and personality in pharmacy. *Int J Clin Pharm*  
646 2012;34:876-884.
- 647 74. Cordina M, Lauri M-A, Lauri J. Patient-oriented personality traits of first-year pharmacy  
648 students. *Am J Pharm Educ* 2010;74:84.
- 649 75. Cordina M, Lauri M-A, Buttigieg R, Lauri J. Personality traits of pharmacy and medical  
650 students throughout their course of studies. *Pharm Pract* 2015;13:640.
- 651 76. Van Rensburg S, Rothman JC. The relationship between personality characteristics and career  
652 anchors of pharmacists. *Man Dyn* 2003;12:24-33.
- 653 77. Larson LM, Wei M, Wu T-F, Borgen FH, Bailey DC. Discriminating among educational  
654 majors and career aspirations in Taiwanese undergraduates: the contribution of personality  
655 and self-efficacy. *J Couns Psychol* 2007;54:395-408.
- 656 78. Smithikrai C. Personality traits and job success: an investigation in a Thai sample. *Int J Sel*  
657 *Assess* 2007;15:134-138.
- 658 79. McCrae RR, Costa PT. Trait explanations in personality psychology. *Eur J Pers* 1995;9:231-  
659 252.
- 660 80. Roberts BW, Wood D, Caspi A. The development of personality traits in adulthood In: John  
661 OP, Robins RW, Pervin LA, eds. *Handbook of Personality: Theory and Research*. New York:  
662 Guilford Press; 2008:375-398.
- 663 81. Olver JM, Mooradian TA. Personality traits and personal values: a conceptual and empirical  
664 integration. *Pers Individ Dif* 2003;35:109-125.
- 665 82. Srivastava S, John OP, Gosling SD, Potter J. Development of personality in early and middle  
666 adulthood: Set like plaster or persistent change? *J Pers Soc Psychol* 2003;84:1041-1053.
- 667 83. Bandura A. Social cognitive theory: an agentic perspective. *Annu Rev Psychol* 2001;52:1-26.
- 668 84. Mischel W, Shoda Y. Toward a Unified Theory of Personality. In: John OP, Robins RW,  
669 Pervin LA, eds. *Handbook of Personality: Theory and Research*. 3rd ed. New York: Guilford  
670 Press; 2008:208-241.
- 671 85. Costa PT, MacCrae RR. *Revised NEO personality inventory (NEO PI-R) and NEO five-factor*  
672 *inventory (NEO FFI): Professional manual*: Psychological Assessment Resources; 1992.
- 673 86. Costa PT, McCrae RR. The revised NEO personality inventory (NEO-PI-R). In: Boyle GJ,  
674 Matthews G, Saklofske DH, eds. *The SAGE Handbook of Personality Theory and*  
675 *Assessment*. London: Sage Publications;2008:179-198.
- 676 87. John OP, Naumann LP, Soto, CJ. Paradigm shift to the integrative Big Five trait taxonomy.  
677 History, measurement, and conceptual issues In: John OP, Robins RW, Pervin LA, eds.  
678 *Handbook of Personality: Theory and Research*. 3rd ed. New York: Guilford Press;  
679 2008:114-158.

- 680 88. Robins RW, Tracy JL, Trzesniewski K, Potter J, Gosling SD. Personality correlates of self-  
681 esteem. *J Res Pers* 2001;35:463-482.
- 682 89. McCombie RP, O'Connor SS, Schumacher SD. A comparative investigation of personality  
683 traits between two allied health professions: Occupational therapy and physiotherapy. *Int J*  
684 *Ther Rehabil* 2015;22:377-384.
- 685 90. Drosdeck JM, Osayi SN, Peterson LA, Yu L, Ellison EC, Muscarella P. Surgeon and  
686 nonsurgeon personalities at different career points. *J Surg Res* 2015;196:60-66.
- 687 91. Scheepers RA, Lombarts KMJM, van Aken MAG, Heineman MJ, Arah OA. Personality  
688 traits affect teaching performance of attending physicians: Results of a multi-center  
689 observational study. *PloS One* 2014;9:e98107.
- 690 92. Hoffman BM, Coons MJ, Kuo PC. Personality differences between surgery residents,  
691 nonsurgery residents, and medical students. *Surgery* 2010;148:187-193.
- 692 93. Plaisant O. Medical students' attitudes towards science and gross anatomy, and the  
693 relationship to personality. *J Anat* 2014;224:261-269.
- 694 94. Foulkrod KH, Field C, Brown CVR. Trauma surgeon personality and job satisfaction: results  
695 from a national survey. *Am Surg* 2010;76:422-427.
- 696 95. Jones MP, Humphreys JS, Nicholson T. Is personality the missing link in understanding  
697 recruitment and retention of rural general practitioners? *Aust J Rural Health* 2012;20:74-79.
- 698 96. Duberstein P. Influences on patients' ratings of physicians: physicians demographics and  
699 personality. *Patient Educ Couns* 2007;65:270-274.
- 700 97. Allroggen M, Kleinrahm R, Rau TAD, Weninger L, Ludolph AG, Plener PL. Nonsuicidal  
701 self-injury and its relation to personality traits in medical students. *J Nerv Men Dis*  
702 2014;202:300-304.
- 703 98. Chibnall JT, Chibnall JT, Blaskiewicz RJ, Detrick P. Are medical students agreeable An  
704 exploration of personality in relation to clinical skills training. *Med Teach* 2009;31:e311-  
705 e315.
- 706 99. Costa P. Associations between medical student empathy and personality: a multi-institutional  
707 study. *PloS One* 2014;9:e89254.
- 708 100. Jones MP, Eley D, Lampe L, et al. Role of personality in medical students' initial intention to  
709 become rural doctors. *Aust J Rural Health* 2013;21:80-89.
- 710 101. Lievens F, Coetsier P, De Fruyt F, De Maeseneer J. Medical students' personality  
711 characteristics and academic performance: a five-factor model perspective. *Med Educ*  
712 2002;36:1050-1056.
- 713 102. Marvão P. An exploratory study on the contribution of graduate entry students personality to  
714 the diversity of medical student populations. *Perspect Med Educ* 2014;3:431-442.
- 715 103. Wilson I, Griffin B, Lampe L, et al. Variation in personality traits of medical students  
716 between schools of medicine. *Med Teach* 2013;35:944-948.
- 717 104. Bolender JS. *Predictors of certification scores in family nurse practitioners: Personality,*  
718 *academic, and demographic factors*. USA, ProQuest Information & Learning; 2002.
- 719 105. Kennedy B, Curtis K, Waters D. The personality of emergency nurses: is it unique? *Australas*  
720 *Emerg Nurs J* 2014;17:139-145.
- 721 106. Baldacchino DR. Student nurses' personality traits and the nursing profession: part 2. *Br J*  
722 *Nurs* 2012;21:530-535.
- 723 107. Doering PL. Prescribing authority for pharmacists, Florida style: a home run or a swing and a  
724 miss? *Ann Pharmacother* 2007;41:1878-1883.
- 725 108. Armitage C, Christopher JA, Mark C. Efficacy of the theory of planned behaviour: A meta-  
726 analytic review. *Br J Soc Psychol* 2001;40:471.

- 727 109. Mankarious E, Kothe E. A meta-analysis of the effects of measuring theory of planned  
728 behaviour constructs on behaviour within prospective studies. *Health Psychol Rev*  
729 2015;9:190-204.
- 730 110. Conner M, Taylor NJ, Lawton RJ. Prospective prediction of health-related behaviours with  
731 the Theory of Planned Behaviour: a meta-analysis. *Health Psychol Rev* 2011;5:97-48.
- 732 111. Rutter PR, Hunt AJ, Jones IF. Exploring the gap: community pharmacists' perceptions of their  
733 current role compared with their aspirations. *Int J Pharm Pract* 2000;8:204-208.
- 734 112. McEachan RRC, Conner M, Taylor NJ, Lawton RJ. Prospective prediction of health-related  
735 behaviours with the Theory of Planned Behaviour: a meta-analysis. *Health Psychol Rev*  
736 2011;5:97-48.
- 737 113. Puspitasari HP, Costa DSJ, Aslani P, Krass I. An explanatory model of community  
738 pharmacists' support in the secondary prevention of cardiovascular disease. *Res Soc Admin*  
739 *Pharm* 2016;12:104-118.
- 740 114. Deguzman VED. *Examining the Implementation of Medication Therapy Management*  
741 *Services Using the Theory of Planned Behavior*. ProQuest Dissertations Publishing; 2015.
- 742 115. Fleming ML, Barner JC, Brown CM, Shepherd MD, Strassels S, Novak S. Using the theory  
743 of planned behavior to examine pharmacists' intention to utilize a prescription drug  
744 monitoring program database. *Res Soc Admin Pharm* 2014;10:285-296.
- 745 116. Gavaza P, Fleming M, Barner JC. Examination of psychosocial predictors of Virginia  
746 pharmacists' intention to utilize a prescription drug monitoring program using the theory of  
747 planned behavior. *Res Soc Admin Pharm* 2014;10:448-458.
- 748 117. Gavaza P, Brown CM, Lawson KA, Rascati KL, Wilson JP, Steinhardt M. Examination of  
749 pharmacists' intention to report serious adverse drug events (ADEs) to the FDA using the  
750 theory of planned behavior. *Res Soc Admin Pharm* 2011;7:369-382.
- 751 118. Kelly DV, Bishop L, Young S, Hawboldt J, Phillips L, Keough TM. Pharmacist and  
752 physician views on collaborative practice: findings from the community pharmaceutical care  
753 project. *Can Pharm J* 2013;146:218-226.
- 754 119. Patterson BJ, Solimeo SL, Stewart KR, Rosenthal GE, Kaboli PJ, Lund BC. Perceptions of  
755 pharmacists' integration into patient-centered medical home teams. *Res Soc Admin Pharm*  
756 2015;11:85-95.
- 757 120. Bryant LJ, Coster G, Gamble GD, McCormick RN. General practitioners' and pharmacists'  
758 perceptions of the role of community pharmacists in delivering clinical services. *Res Soc*  
759 *Admin Pharm* 2009;5:347-362.
- 760 121. Hatah E, Braund R, Duffull SB, Tordoff J. General practitioners' views of pharmacists'  
761 current and potential contributions to medication review and prescribing in New Zealand.  
762 *Journal Prim Health Care* 2013;5:223-233.
- 763 122. Tarn DM, Paterniti DA, Wenger NS, Williams BR, Chewning BA. Older patient, physician  
764 and pharmacist perspectives about community pharmacists' roles. *Int J Pharm Prac*  
765 2012;20:285-293.
- 766 123. Doucette WR, Nevins J, McDonough RP. Factors affecting collaborative care between  
767 pharmacists and physicians. *Res Soc Admin Pharm* 2005;1:565-578.
- 768 124. Luetsch K, Rowett D. Interprofessional communication training: benefits to practicing  
769 pharmacists. *Int J Clin Pharm* 2015;37:857-864.
- 770 125. Snyder ME, Zillich AJ, Primack BA, et al. Exploring successful community pharmacist-  
771 physician collaborative working relationships using mixed methods. *Res Soc Admin Pharm*  
772 2010;6:307-323.

- 773 126. Bradley F, Elvey R, Ashcroft DM, et al. The challenge of integrating community pharmacists  
774 into the primary health care team: a case study of local pharmaceutical services (LPS) pilots  
775 and interprofessional collaboration. *J Interprof Care* 2008;22:387-398.
- 776 127. Scott A, Bond C, Inch J, Grant A. Preferences of community pharmacists for extended roles  
777 in primary care: a survey and discrete choice experiment. *Pharmacoeconomics* 2007;25:783-  
778 792.
- 779 128. Truong K, Rosenthal M, Tsuyuki RT. Asleep at the wheel: pharmacy practice research  
780 advocacy and knowledge translation by Canadian pharmacy organizations. *Can Pharm J*  
781 2010;143:78-81.
- 782 129. Hughes CM, McCann S. Perceived interprofessional barriers between community pharmacists  
783 and general practitioners: a qualitative assessment. *Brit J Gen Pract.* 2003;53:600-606.
- 784 130. Jacobs S, Ashcroft D, Hassell K. Culture in community pharmacy organisations: what can we  
785 glean from the literature? *J Health Organ Manag* 2011;25:420-454.
- 786 131. Farris KB, Schopflocher DP. Between intention and behavior: an application of community  
787 pharmacists' assessment of pharmaceutical care. *Soc Sci Med* 1999;49:55-66.
- 788 132. Mount M, Barrick M, Stewart G. Five-Factor Model of personality and Performance in Jobs  
789 Involving Interpersonal Interactions. *Human Perf* 1998;11:145-165.
- 790 133. Hertz GM, Donovan JJ. Personality and Job Performance: The Big Five Revisited. *J Appl*  
791 *Psychol* 2000;85:869-879.
- 792 134. Poropat AE. A meta-analysis of the five-factor model of personality and academic  
793 performance. *Psychol Bull* 2009;135:322-338.
- 794 135. McCrae RR. Creativity, Divergent thinking, and openness to experience. *J Pers Soc Psychol*  
795 1987;52:1258-1265.
- 796 136. Steel GD, Rinne T, Fairweather J. Personality, nations, and innovation: relationships between  
797 personality traits and national innovation scores. *Cross Cult Res* 2012;46:3-30.
- 798 137. Huang JL, Ryan AM, Zabel KL, Palmer A. Personality and adaptive performance at work: a  
799 meta-analytic investigation. *J Appl Psychol* 2014;99:162-179.
- 800 138. Schmitt DP, Allik J, McCrae RR, Benet-Martínez V. The Geographic Distribution of Big Five  
801 Personality Traits: Patterns and Profiles of Human Self-Description Across 56 Nations. *J*  
802 *Cross Cult Psychol* 2007;38:173-212.
- 803 139. Soto CJ, John OP. Ten facet scales for the Big Five Inventory: Convergence with NEO PI-R  
804 facets, self-peer agreement, and discriminant validity. *J Res Pers* 2009;43:84-90.
- 805 140. Cocolas GH, Sleath B, Hanson-Divers EC. Use of the Gordon Personal Profile Inventory of  
806 pharmacists and pharmacy students. *Am J Pharm Educ* 1997;61:257-265.
- 807 141. Frankel GEC, Austin Z. Responsibility and confidence: Identifying barriers to advanced  
808 pharmacy practice. *Can Pharm J* 2013;146:155-161.
- 809 142. Droege M, Assa-Eley MT. Pharmacists as care providers: Personal attributes of recent  
810 pharmacy graduates. *Am J Pharm Educ* 2005;65:290-295.
- 811 143. Agomo CO. Why UK pharmacy must adapt to the increasing demands of professionalism in  
812 practice. *Int J Pharm Pract* 2012;20:320-323.
- 813 144. Noble C, Coombes I, Shaw PN, Nissen LM, Clavarino A. Becoming a pharmacist: the role of  
814 curriculum in professional identity formation. *Pharm Pract* 2014;12:380.
- 815 145. Noble C, Shaw PN, Nissen L, Coombes I. Curriculum for uncertainty: Certainty may not be  
816 the answer. *Am J Pharm Educ* 2011;75:13a.
- 817 146. McGreevy J, Wiebe D. A preliminary measurement of the surgical personality. *Am J Surg*  
818 2002;184:121-125.
- 819 147. Malhi GS, Coulston CM, Parker GB, et al. Who picks psychiatry? Perceptions, preferences  
820 and personality of medical Students. *Aust N Z J Psychiatry* 2011;45:861-870



- 821 148. Roberts J. Personality traits of pharmacists. *Can Pharm J* 2010;143:105-106.
- 822 149. Ghumman A. Barriers to the advancement of community pharmacy: solutions for a  
823 progressing profession. *Can Pharm J* 2009;142:254-255.
- 824 150. Braund R, Chesney KM, Keast EP, et al. Are all pharmacy staff interested in potential future  
825 roles? *Int J Pharm Pract* 2012;20:417-421.
- 826

ACCEPTED MANUSCRIPT

## 827 Appendix 1. Search strategies

MEDLINE	((MH "Pharmaceutical Services") OR (MH "Community Pharmacy Services") OR (pharmacies OR pharmacy OR pharmacist*)) AND (attribute* OR attitude*)
CINAHL	("pharmaceutical care" OR "community pharmacy" OR pharmacist* OR pharmacy OR pharmacies) AND (attribute* OR attitude*)
PsycINFO	("pharmaceutical care" OR "community pharmacy" OR pharmacist* OR pharmacy OR pharmacies) AND (attribute* OR attitude*)

828

829

830

831

832

## 833 Appendix 2. Overview of studies reporting on pharmacists' attitudes in relation to cognitive service implementation

Author(s) / Year	Study objective	Participants / Location	Pharmacy Service / Research Method	Major findings
<b>Medication Therapy Management (MTM)</b>				
Blake et al. <sup>22</sup>	To assess pharmacists' perception of educational and training needs necessary to implement MTMS.	203/503 community pharmacy, pharmacists in charge, USA	MTM / Survey	Respondents felt comfortable in providing MTMS and had a favourable view of the value of these services to patients.
Herbert et al. <sup>24</sup>	To predict the behavioural intention of pharmacists to provide MTM.	203/500 community pharmacists, USA	MTM / Survey	Pharmacists showed generally positive intent to provide MTMS.
Law et al. <sup>23</sup>	To explore pharmacists' perceived preparedness, willingness, and challenges toward providing MTM services.	143 community pharmacist, USA	MTM / Survey	Community independent pharmacists reported being ready, willing, and able to provide MTM services. A lack of time, billing arrangements and reimbursement were named as challenges.
MacIntosh et al. <sup>26</sup>	To evaluate differences in community pharmacy managers' attitudes towards MTM based in relation to use of Mirixa.	200 community pharmacy managers, USA	MTM / Survey	Majority showed positive attitude towards pharmacists providing MTM and its value to patients, but stated difficulties finding time for MTM or setting aside time for one-to-one consultations during business hours.
Shah and Chawla <sup>25</sup>	To investigate pharmacists' attitudes, efforts, interest, and challenges in providing MTM.	93/123 community pharmacists, USA	MTM / Survey	Pharmacists had positive attitudes toward provision of MTM, regarding it as an opportunity to engage in patient care, and were very interested in providing some MTM services.
<b>Medication (Utilisation) Review</b>				

Bradley et al. <sup>36</sup>	To explore and identify the key determinants influencing the uptake of medicines use reviews.	Primary care organisations, including community pharmacists, UK	MUR commissioning and provision / Questionnaire & interviews, MUR data	Stakeholders believed in the potential for MURs to contribute to professional integration and patient care.
Bryant et al. <sup>32</sup>	To explore attitudinal factors that prevent increased participation of community pharmacists in medication reviews.	20 Pharmacists, NZ	Medication review (GP collaborative) / Semi-structured interviews	The themes that emerged from the interviews questioned whether provision of clinical medication reviews was mandated, had legitimacy, was effective, and the adequacy of the pharmacist to provide the service.
Harding and Wilcock <sup>33</sup>	To explore existing mechanism to ensure quality assurance of medicine use reviews.	50 Community pharmacists, UK	MUR / Survey	Community pharmacists generally had a positive attitude towards MURs but think special skills are needed to perform MUR.
Latif and Broadman <sup>34</sup>	To explore community pharmacists' attitudes towards MUR.	167/600 community pharmacists, Norway	MUR / Survey	Pharmacists were positive about MUR viewing it as beneficial to both pharmacists (use of professional skills) and patients (improve medicines use).
McDonald et al. <sup>35</sup>	To evaluate attitudes towards new contracts including MUR	49 community pharmacists, UK	MUR / Interviews	Most pharmacists welcomed the new contract including MUR to encourage a move away from dispensing. But all pharmacists also described their working environment as very busy and driven to a large extent by the need to maintain dispensing volumes.
<b>Pharmaceutical Care</b>				
Amsler et al. <sup>31</sup>	To evaluate pharmacists' beliefs about pharmaceutical care.	11 community pharmacists, USA	Pharmaceutical care / Focus groups	Pharmacists willing to provide pharmaceutical care.

Cates et al. <sup>29</sup>	To explore attitudes of pharmacists toward mental illness and provision of pharmaceutical care to mentally ill patients.	187 community pharmacists, USA	Pharmaceutical care / Survey	Pharmacists showed positive attitude towards providing PC, expressing confidence and interest.
Dunlop and Shaw <sup>27</sup>	To determine attitudes to the concept of pharmaceutical care.	377/490 community pharmacists, NZ	Pharmaceutical care / Survey	More than 50% support the concept of PC and see the future of pharmacy in professional services other than dispensing. Barriers identified were lack of time, remuneration, adequate skills.
Liekens et al. <sup>28</sup>	To evaluate pharmacists' attitudes, current practice, perceived barriers and training needs concerning pharmaceutical care for people with depression.	149/181 community pharmacists, Belgium	Pharmaceutical care / Survey	Pharmacists' attitude toward their role in depression care can be considered positive. No difference in attitude to providing PC for people with depression or physical illness
Montgomery et al. <sup>30</sup>	To explore perceptions of pharmaceutical care.	5 community pharmacists, Sweden	Pharmaceutical care / Focus groups	Positive perceptions of PC by pharmacists, regarded as professionally rewarding.
<b>Immunisation</b>				
Aldrich and Sullivan <sup>39</sup>	To determine pharmacists' attitudes toward immunisations and assess possible barriers.	137/500 pharmacists, USA	Immunisation / Survey	Mixed attitudes to providing immunisation, concerns on work environment, organisation and time pressure.
Kamal et al. <sup>12</sup>	To obtain information about willingness to provide immunisation services, current involvement.	1266/6000 pharmacists, USA (follow-up on a 2001 survey)	Immunisation / Survey	Respondents were willing to administer vaccines, very willing to counsel and promote immunisation. Main factors perceived as problematic were availability of time, concerns about legal liability.

Luthin et al. <sup>66</sup>	To examine pharmacy students' knowledge about, attitudes toward, and intention to provide pharmacy-based immunization services (PBIS).			Approximately 80% of students felt they had sufficient knowledge/skills to provide PBIS upon graduation; mean and 58% intended to do so.
Marcum et al. <sup>40</sup>	To assess the impact of a national immunisation training certificate program on the perceived knowledge, skills and attitudes of pharmacy students towards pharmacy-based immunisations.	57 pharmacy students enrolled in immunisation elective, USA	KSA Pre-and post-training / Survey	Increase in knowledge & skills, high positive attitudes (capability, job satisfaction, public health benefit) around pharmacist immunisation between pre & post training.
Pace et al. <sup>38</sup>	To determine community pharmacists' attitudes and knowledge on providing immunizations including perceived barriers to immunizing.	129/350 community pharmacists, USA	Survey	The majority of respondents believed administering immunizations has advanced or significantly advanced the profession. Commonly reported barriers included time, followed by reimbursement and legal liability
Valiquette and Bédard <sup>37</sup>	To describe the knowledge, beliefs and attitudes of pharmacists towards immunisation and determine their perceived barriers to pharmacist-led immunisation.	115/201 community pharmacists, Canada	Immunisation / Survey	52% thought pharmacists should be able to prescribe and administer vaccines.
<b>Pharmacist prescribing</b>				
Dawoud et al. <sup>2</sup>	To investigate pharmacist supplementary prescribers' views and experiences.	16 pharmacist prescribers, UK	Supplementary prescribing / Semi-structured	Positive attitude towards supplementary prescribing, beliefs it improves patient care and provided a step forward in career.

			interviews	
George et al. <sup>51</sup>	To investigate community pharmacists' awareness, views and attitudes relating to independent prescribing.	217/500 community pharmacists, Scotland	Prescribing / Survey	Positive attitude towards independent prescribing by pharmacists, perceiving benefits to patients, indicating intention to become an independent prescriber.
Hobson and Sewell <sup>53</sup>	To provide data on the views of chief pharmacists and primary care trust pharmacists on the risks and concerns surrounding supplementary prescribing.	280/415 Chief & PCT pharmacists, primary and secondary care, UK	Prescribing / Survey	Overall a positive attitude towards supplementary prescribing with a belief that pharmacists wish to take on role. Concerns were raised over the training model for supplementary prescribing, professional competence and responsibility once trainees qualify.
Hoti et al. <sup>52,59</sup>	To compare the attitudes of hospital and community pharmacists regarding an expanded prescribing role.	1049/2592 hospital and community pharmacists, Australia	Prescribing / Survey	84% agreed to expanded prescribing role (mainly supplementary versus independent), regarding it as making better use of pharmacists' skills.
Hutchison et al. <sup>54</sup>	To determine reasons for adoption of additional prescribing authorisation.	314/500 hospital pharmacists, Canada	Prescribing / Survey	Pharmacist with APA generally more positive (stronger beliefs on values and relevancy, increase efficiency of practice, decrease time to contact physicians, stronger confidence in ability to follow-up) than those without.
Lloyd and Hughes <sup>57</sup>	To explore context and experiences in relation to supplementary prescribing.	47 pharmacists, primary & secondary care, 35 mentors, Northern Ireland	Prescribing / Focus groups, semi-structured interviews	Pharmacists and mentors perceived SP as improving job satisfaction, concerns about added responsibility
McCann et al. <sup>55</sup>	To capture information on pharmacist prescribing.	100 pharmacist prescribers, Northern Ireland	Prescribing / Survey	Positive attitude towards independent and supplementary prescribing, perceiving increased professional autonomy, status,

				utilisation of skills
McIntosh et al. <sup>56</sup>	To investigate newly registered pharmacists' awareness of pharmacist prescribing and views on potential future roles as prescribers.	418/1658 newly registered pharmacists, UK	Prescribing / Survey	86% expressed interest in training as independent prescriber. Perception that prescribing role would improve patient care, enhance professional standing.
Stewart et al. <sup>60</sup>	To investigate pharmacists, who have not yet applied for a supplementary prescribing (SP) course, their planned participation in training, and attitudes towards pharmacist SP.	2371/4300 pharmacist, UK	Prescribing / Survey	Most determined that practising SP would improve the care of their patients and that SP would enhance their professional standing.
Stewart et al. <sup>61</sup>	To explore the perspectives of pharmacist supplementary prescribers, their linked independent prescribers and patients towards pharmacist prescribing.	10 supplementary prescribers, Scotland	Prescribing / Interviews	Perceived benefits to patients (access, quality) and increased role satisfaction. Independent prescribing was considered by all to be the obvious next stage in their development, which was not supported by doctors.
Tully et al. <sup>50</sup>	To investigate the views and experiences of pharmacists before and after they registered as supplementary prescribers.	16 pharmacists, UK	Prescribing / Semi-structured interviews	Before registration pharmacists were positive that their role would change, providing a more efficient service in their teams, post registration many weren't able to use their skills.
Warchal et al. <sup>58</sup>	To explore whether completing a prescribing course can empower pharmacists in terms	38 pharmacist supplementary prescribers, UK	Prescribing / Survey and interviews	Pharmacists felt confident to undertake SP and perceived benefits for themselves and patients in taking up their new role.



	of their extended roles.			
Weiss et al. <sup>3</sup>	To evaluate supplementary prescribing by pharmacists.	23 pharmacist supplementary prescribers, UK	Prescribing / Semi-structured interviews	The pharmacist supplementary prescribers embraced the challenges and benefits of supplementary prescribing. They perceived clear benefits for patients and themselves.
	<b>Other services</b>			
Demik et al. <sup>64</sup>	To determine correlation between existing clinical pharmacy services within a practice-based research network and provider attitudes and beliefs regarding implementing a new pharmacy intervention.	40 Pharmacists and 321 physicians in primary care practice, USA	Implementation of hypertension and asthma intervention/ Pharmacy service and TPB surveys	Pharmacists either were more accepting and willing to initiate a new pharmacy intervention, or they believed it would be more straightforward to implement a new program than did their physician counterparts. Pharmacists might be more willing to participate directly in patient-care than physicians are willing to delegate responsibility.
Dobson et al. <sup>62</sup>	To determine the extent to which community pharmacists are prepared to be members of the health care team, and to assess their support for general expansion of clinical responsibilities.	470/1337 community pharmacists, Canada	Expansion of clinical responsibilities / Survey	Most participants indicated community pharmacists should be more involved in selecting and monitoring drug therapy, and be more responsible for treating minor illnesses as part of the primary health care team.
Emmertson et al. <sup>46</sup>	To evaluate experiences of pharmacists participating in a Pharmacy Asthma Management Service	32 community pharmacists, Australia	Pharmacy Asthma Management Service (PAMS) / Focus groups, semi-structured interviews	Pharmacists embraced participation in the PAMS, positive effects on job satisfaction and attitude towards future of the service.

Freeman et al. <sup>63</sup>	To describe stakeholder opinions of integrating a pharmacist into primary care practice	25 community pharmacists, Australia	Clinical pharmacy service in primary care practice / Focus groups, semi-structured interview	Pharmacists perceived positive aspects in providing clinical services within primary care practices (medication review, prescribing) and envisaged participation in specialty clinics.
Jorgensen et al. <sup>65</sup>	To assess the thoughts and perceptions of pharmacists on patient-centred care and expanded roles.	1003 pharmacists, Canada	Pharmacist clinical role extension / Survey	Majority of pharmacists' perceived urgency to change their role and showed positive attitude towards role extension with perceived benefits for patient health outcomes and increased job satisfaction.
Lowrie et al. <sup>43</sup>	To explore perspectives of pharmacists delivering an enhanced, pay for performance (P4P) community pharmacy HF service.	10 community pharmacists, Scotland	Enhanced, P4P HF service / Focus group	Pharmacists confident in service delivery, experiencing role satisfaction.
Mansoor et al. <sup>42</sup>	To assess community pharmacists' attitudes and barriers to adherence support and investigate activities in supporting patient medication adherence in their practice.	126/500 community pharmacists, Australia	Adherence support/ Survey	98 % of pharmacists agreed that it was their role to promote patients' adherence.
O'Connor et al. <sup>41</sup>	To investigate community pharmacists' attitudes, beliefs, feelings, and knowledge about palliative care.	250/1002 Community pharmacists, Australia	Palliative care / Survey	Pharmacists were generally positive about providing services and supports for palliative care patients, perceiving benefits to patients and carers.
Puspitasari et al. <sup>45</sup>	To explore the scope of pharmacists' activities in supporting CVD secondary	21 community pharmacists, Australia	CVD prevention activities / Semi-structured	Pharmacists thought they have an important role to play in supporting clients in CVD secondary prevention.

	prevention.		interviews	
Rieck et al. <sup>47</sup>	To explore physician and CP perceptions of the CP's role in Australian primary care and how these perceptions may influence the quality of physician/CP CDM programmes.	22 community pharmacists, 22 General Practitioners, Australia	Chronic disease management / Semi-structured interviews	Pharmacists frustrated at trying to move away from a business model to a healthcare professional service orientated model.
Schweizer and Hughes <sup>48</sup>	To explore the views of community pharmacists as to their present and potential role in providing care to the residents of nursing and residential homes.	254/508 community pharmacists, Northern Ireland.	Pharmaceutical service / Survey	Pharmacists supported extending their role in care homes, e.g. assessing residents' medication needs and providing advice to staff.
Um et al. <sup>49</sup>	To explore pharmacists' opinions about the provision of weight management services.	20 Community pharmacists, Australia	Obesity management / Semi-structured interviews	Pharmacists are motivated and willing to participate in accredited evidence-based weight management programs.
Wells et al. <sup>44</sup>	To explore community pharmacist and superintendent pharmacist views and experiences of adherence support service.	15 community pharmacists, UK	Adherence support/ Focus groups	Participants were enthusiastic about the potential of an adherence support service to benefit patients and the pharmacy profession.

834

835

836

837

## 838 Appendix 3. Overview of studies included in review reporting on pharmacists' attributes

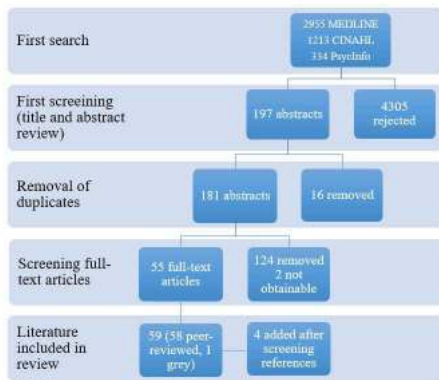
Author(s) / year	Objectives	Participants / Location	Instrument	Main findings of the study
Kittisopee <sup>67</sup>	To investigate the effect of five factors of personality on behaviour relative to pharmaceutical care.	341/600 pharmacists, USA	BFI TPB survey	Personality traits influenced behavioural intention but not actual provision of pharmaceutical care, which was predicted by TPB factors.
Hall et al. <sup>68</sup>	To characterize the personality traits of hospital pharmacists to provide insights into potential barriers to practice change.	347/766 hospital pharmacists, Canada	BFI	Hospital pharmacists tended toward stronger expressions of the traits of extraversion, agreeableness, conscientiousness, and openness and were emotionally stable.
Rosenthal et al. <sup>69</sup>	To investigate possible relationships between cultural factors, personality traits and the uptake of advanced practice opportunities.	945/ 4975 pharmacists, Canada	Organizational Culture Profile (OCP) BFI	It would appear pharmacist respondents might be more likely to exhibit behaviours in line with the traits of agreeableness, conscientiousness, and openness. Respondents who scored higher on the BFI trait extraversion provided a higher number of immunizations but lower numbers of medication reviews.
Rosenthal et al. <sup>70</sup>	To gain descriptive insight into the culture and personality traits of pharmacists with additional prescribing authorisation.	65/167 pharmacists with APA, Canada	OCP BFI	Interpretation of the BFI findings suggests that the majority of innovator and early adopter pharmacist respondents may be more likely to exhibit behaviour in line extraversion, agreeableness, conscientiousness and openness.
Rosenthal et al. <sup>71</sup>	To compare results of BFI measures of pharmacists' performance in a research trial.	23 pharmacists with APA, Canada	BFI Performance measures	Pre-specified hypotheses that personality traits would correlate to certain performance measures in the practice research trial weren't supported.
Rosenthal et al. <sup>72</sup>	To gain insight into the culture of hospital pharmacy and into hospital pharmacists' personality traits.	401/5600 hospital pharmacists, Canada	OCP BFI	A significant association was noted between number of years in practice and the BFI trait of conscientiousness; time spent performing clinical activities and scores of agreeableness and conscientiousness.

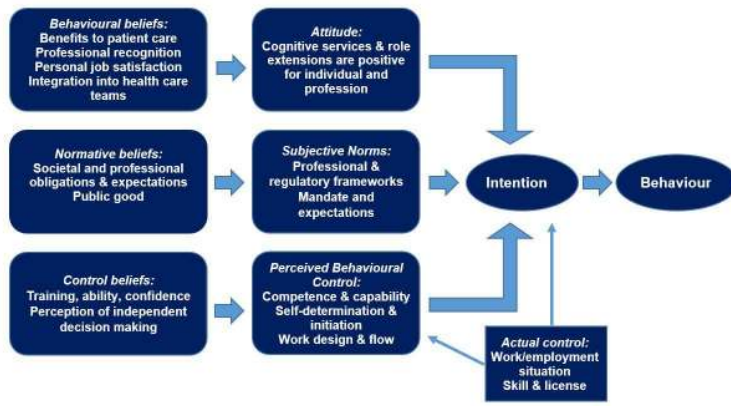
Van Rensburg and Rothman <sup>76</sup>	To assess the relationship between personality characteristics and career anchors of pharmacists.	56/62 pharmacists, South Africa	MBTI NEO-PI-R Career Orientation Inventory	Pharmacists who measured higher on extraversion and lower on neuroticism, agreeableness tend to have 'General Management' as a career anchor. Pharmacists who measured higher on extraversion, openness to experience and lower on neuroticism tend to have 'Service, Challenge, Entrepreneurial Challenge' as career anchors.
Larson et al. <sup>77</sup>	To determine whether the Big Five personality factors and vocational confidence measures were useful in discriminating among educational majors and career aspirations.	55 pharmacy students in a sample of 312 university students, Taiwan	NEO-PI-R	Pharmacy students scored higher for conscientiousness, lower for agreeableness and equal for other traits compared to other university students. Women were more agreeable than males.
Smithikrai <sup>78</sup>	To examine the predictive power of each facet of the five-factor model of personality on job success.	312 pharmacists in a sample of 2518 professionals, Thailand	NEO-FFI-S	Conscientiousness was the only construct that consistently predicted job success across six occupations.
Cordina et al. <sup>73</sup>	To explore the relationship between personality and career paths taken by pharmacists.	282/829 pharmacists, Malta	Gordon Personal Profile-Inventory (GPP-I)	Most of the types of pharmacists considered scored closely to the average categories of the GPPI attributes. Pharmacists that do not possess personalities that are conducive to patient-oriented practice appear to have chosen to practice in non-traditional areas where, possibly, they have found a good fit with their personality and other factors.
Cordina et al. <sup>74</sup>	To determine if the personality traits of first-year pharmacy students match the traits required for patient-centered practice.	63/69 pharmacy students, Malta	GPP-I	Students with strong traits of original thinking, followed by personal relations, and vigour were attracted to pharmacy. Pharmacy students exhibited a predisposition to caring and developing caring, collaborative relationships with patients and other

				health care providers.
Cordina et al. <sup>75</sup>	To study the personality traits of a cohort of students studying pharmacy and medicine in their first and final year.	40 pharmacy students followed from 1 <sup>st</sup> to 5 <sup>th</sup> year, Malta	GPP-I	Baseline scores of 1 <sup>st</sup> year pharmacy students increased by the end of the course for responsibility, cautiousness, original- thinking and vigour.

839

840







**Highlights**

- Pharmacists' attitudes and personal attributes towards novel pharmacy services were investigated.
- Recent empirical research of varying design was summarised by a scoping review.
- Pharmacists' personality traits, attributes and attitudes are not major barriers to practice change.
- Individual pharmacists need support to implement patient-focused, extended services.
- An analysis indicates systemic and organisational barriers may need to be addressed.