

Multimedia Appendix 3. Themes addressed by each article.

Authors, year	Category													
	Inputs						Processes				Outputs			
	Portal design	Usability	Barriers	Facilitators	User training	Organizational factors	Adoption	Usage	Information	Communication	Patient engagement	User perceptions	Health outcomes	Benefits
Adler-Milstein et al 2017 [24]						x								
Aljabri et al 2018 [4]				x			x	x					x	
Ammenwerth et al 2012 [9]										x	x	x	x	
Arnold et al 2013 [25]	x											x		
Baudendistel et al 2015 [26]												x		
Borbolla et al 2014 [27]	x													
Caine et al 2015 [28]	x											x		
Dumitrascu et al 2018 [20]													x	x
Essen et al 2017 [29]						x								
Giardina et al 2014 [30]									x		x	x	x	
Grant 2006 [31]	x													
Greenberg et al 2016 [32]						x								
Griffin et al 2016 [2]								x		x	x		x	
Grossman et al 2018 [33]	x							x	x	x	x	x	x	x
Hazara & Bhandari 2015 [34]			x				x	x				x		
Hefner et al 2017 [5]					x							x		
Hefner et al 2018 [35]					x					x		x		
Heyworth et al 2014 [36]	x		x								x		x	
Irizarry et al 2015 [16]	x	x	x	x			x	x		x				
Johansen & Henriksen 2014 [37]	x												x	
Kaziunas et al 2016 [38]	x								x		x			
Kelly et al 2017a [39]								x	x	x		x	x	
Kelly et al 2017b [40]					x					x	x	x	x	
Kelly et al 2018 [6]	x	x			x			x	x	x	x	x	x	
Klein et al 2017 [41]					x				x	x		x		
Kruse et al 2015 [3]			x	x				x				x	x	
Lee et al 2017 [42]	x								x			x		
Mikles & Mielenz 2014 [43]								x		x				
Nazi et al 2013 [44]		x						x	x			x		
O'Leary et al 2016 [17]	x										x	x		
Osborn et al 2010 [45]		x	x							x	x	x	x	
Otte-trojel et al 2016 [7]	x										x			
Phelps et al 2014 [46]							x	x			x			
Pillemer et al 2016 [47]								x	x		x	x	x	
Powell 2017 [48]			x	x				x				x		
Prey et al 2014 [18]	x								x	x				
Prey et al 2016 [49]									x					
Ralston et al 2013 [50]								x						
Rappaport et al 2016 [51]	x													
Rathert et al 2017 [52]										x	x			
Rexhepi et al 2018 [53]				x					x	x	x	x		
Risling et al 2017 [54]											x	x	x	

Runaas et al 2016 [55]		x									x	x		x	
Saberi et al 2015 [56]													x		
Snyder et al 2013 [57]		x					x	x	x	x	x	x			
Sorensen et al 2009 [58]	x											x			
Toscos et al 2016 [59]							x				x		x		
van der Vaart et al 2014 [60]		x					x			x	x	x			
van der Vaart et al 2013 [61]	x								x	x	x	x	x	x	
Vawdrey et al 2011 [19]	x	x							x		x	x			
Walker et al 2018a [62]	x								x				x		
Walker et al 2018b [63]	x														
Wibe & Slaughter 2009 [64]										x	x	x			
Winkelman et al 2005 [65]										x		x			
Woollen et al 2016 [66]	x	x		x	x		x	x	x		x	x		x	
Wright et al 2014 [67]												x	x	x	
Yen et al 2018 [68]		x	x	x	x	x				x		x			
Zarcadoolas et al 2013 [69]	x	x	x									x		x	
Theme total	22	11	8	7	7	4	5	18	17	20	24	35	20	7	
Category total	40						36					46			

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