Summary of papers included in scoping review

Study by first author	Aim	Method	Country	Local, national or regional patient feedback	Sample	Summary findings
Adams[1]	To examine comments made on physician review websites from the perspective of reflexivity in modern society. How are patients positioned by the websites and how do they position themselves when	Qualitative. Discourse analysis. Stakeholder interviews.	England, Holland, US.	National	Four websites (PatientOpinion, England; Consumer and Care, Search Doctor, Netherlands; Stories for America, USA), n=450 reviews of professionals and institutions. 15 stakeholders related to the sites.	Patient reflexivity (using knowledge to monitor behaviour and context) is encouraged by websites that intend to use comments for another purpose. Patients think through their experiences and consider alternatives, which is not what is expected of them by policy makers, etc. Comments contain calls for good care and health systems' responsibility to enact it. Most are neutral, containing both positive and negative reflections, especially true in relation to facilities. Each review is not a reflection on a single encounter; patients draw on previous experiences to evaluate current experience.

	writing a review of received care?					Comments usually evaluate doctors' character, ability and professionalism, and often relate to communication skills.

Adams[2]	To examine websites where patients rate and evaluate healthcare services as mechanisms for transforming citizens into surveillers of public services in order to generate knowledge about the everyday performance of professionals and institutions. Use post-panoptic theories about the use of information and	Qualitative. Discourse analysis. Stakeholder interviews.	Part of a wider study in England, US and Holland. This paper focuses on Holland.	National	Analysis of reviews on a Dutch website (Zoekdokter) and 15 stakeholder interviews.	Such websites provide opportunities for monitoring patients and health professionals. Health professionals can be monitored by government bodies, other professionals, patient associations and insurance companies.

	communication technologies in daily life, to question how such sites, and the knowledge they generate, relate to existing surveillance structures.					

| Bardach[3] | To compare hospital scores from the most widely used commercial website in the USA to hospital scores from more systematic measures of patient experience (the Hospital Consumer Assessment of Healthcare Providers and Systems; HCAHPS) and outcomes, and to assess what | Quantitative. Correlation between HCAHPS and Yelp ratings for hospitals in the USA. | US | National | Hospitals with publicly available HCAHPS scores, mortality and readmissions data on the CMS website. | Many hospitals have already been rated. Ratings are increasing over time, though average numbers are low. Increasing Yelp scores are associated with consistently increasing HCAHPS domain scores. |

	drives variation in the commercial website scores.					
Bardach[4]	To investigate whether online narrative reviews from patients and surrogates reflect domains in the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) and to describe additional potential	Qualitative. Thematic analysis to assess online narrative reviews for reference to HCAHPS domains and salient non-HCAHPS domains and to compare results by reviewer	US	National	Hospitals were identified on the American Hospital Association database using a stratified random sampling approach, ensuring reviews on a diverse set of hospitals. Up to two narrative reviews from any source were included for each hospital. Exclusions: Outpatient or emergency department reviews, reviews from	50% of 244 reviews were from patients and 38.1% from friends or family members. 57.0% of reviews mentioned any HCAHPS domain. Additional salient domains were: Financing, including unexpected out-of-pocket costs and difficult interactions with billing departments; system-centred care; and perceptions of safety. These domains were mentioned in 51.2% of reviews. Friends and family members commented on perceptions of safety more frequently than patients. Surrogates view care differently to patients.

	domains. To assess whether the HCAHPS domains are salient to contemporary consumers, whether there are additional domains that might be emerging in a changing healthcare environment, and whether surrogate perspectives may differ from patient perspectives.	type (patient vs surrogate).			self-identified hospital employees, or reviews of <10 words.	

Bidmon[5]	To analyze factors influencing the adoption of and willingness to pay for mobile physician-rating apps.	Quantitative survey and literature review informed the development of a structural equation model.	Germany			958/1,006 German patients who had visited at GP at least once in the previous three months.	Identified vaiables contributing to the adoption of a physician-rating app, including age, gender, feelings about the internet, information-seeking behaviour, use of apps for health info in the past and attitudes. Identified factors affecting willingness to pay.
Black[6]	To evaluate and describe online healthcare provider reviews	Quantitative. Multivariate analysis and logistic regression analyses.	US	Regional		16,703 individual ratings of 6,101 providers in four major cities (Dallas, San Francisco, Chicago, New York) on RateMDs.com. Evaluations collected Feb 2004 - Jun 2009.	RateMDs.com holds high ratings and positive comments about healthcare providers. It was overwhelmingly supportive of healthcare providers.

Brody[7]	To present a fully automated method to capture what topics health consumers discuss when reviewing their health providers online.	Quantitative. Sentiment analysis using Latent Dirichlet Allocation.	US	National	A corpus of reviews from the public RateMDs website.	Analysis at the sentence level and grouping by specialty allows for the identification of specialty-specific review content. There is an association with patient satisfaction questionnaires. Applying machine learning approaches to analysing online reviews provides helpful additional knowledge.
Brookes[8]	To examine the key themes in positive and negative patient feedback on NHS (National Health Service) services in England, and to understand the specific issues within these themes and how	Mixed methods. Machine learning and qualitative analysis	England	National	228 113 comments (28 971 142 words) posted on NHS Choices	NHS services were evaluated positively approximately three times more often than negatively. The four key areas of focus were: treatment, communication, interpersonal skills and system/organisation. Positive feedback was elicited in cases of staff being caring, compassionate and knowing patients' names. Rudeness, apathy and not listening were frequent drivers of negative feedback.

	they drive positive and negative evaluation.					
Brown-Johnson[9]	To describe and characterize public commenting in the context of a high-profile publication on psychiatric inpatient smoking bans and subsequent news coverage on the topic in order to provide mental health administrators a	Qualitative. Content analysis.	US and elsewhere eg UK	International	261 public comments made on an article published in the *New York Times* in Feb 2013 and two other related articles published in *Time* and *Care to Share*. 136 NYT commenters were located in the USA or elsewhere, e.g. the UK. Commenters identified as patients, family members, facilities staff,	There is value in analysing public comments on news articles to reveal view on a health issue. Comments can be rich and wide-ranging in perspective. They can, to some extent, gauge public opinion on health initiatives.

	comprehensive view of potential attitudes toward, and particularly continued resistance to, smoking bans in psychiatric inpatient facilities.				physicians and taxpayers.	

Burkle[10] 2015	To explore the frequency with which patients visit and leave comments on IPRS, identify most commonly visited sites, evaluate the nature of comments written and quantify the influence that positive comments, negative comments and physician medical malpractice history might have on patients'	Quantitative survey.	US		854 (85% response rate) consecutive patients visiting the Pre-Operative Evaluation (POE) Clinic at Mayo Clinic in Rochester Minnesota between Jun-Oct 2013. 51% female. Majority aged 51-65.	The majority had not previously visited an IPRS. Of those writing comments on an IPRS in the past, just over a third provided either unfavorable or a combination of favorable and unfavorable reviews of physician interactions. 28.1 % strongly agreed that a positive review alone would cause them to seek care from that practitioner. 27 % indicated they would avoid physicians with a negative review. Whether a respondent had visited an IPRS in the past had no impact on the answers provided.

	decisions to seek care from a particular physician.					
Detz[11]	To examine publicly available, Internet-based reviews of adult primary care physicians, specifically	Qualitative content analysis. Substudy nested within larger qualitative analysis.	US	National	93 reviews of patients with long-term physician relationship, lasting at least one year. (For parent study, see Lopez, 2012).	Long-term patients were more likely to leave positive feedback and six domains were identified in relation to feedback: (1) personality traits or descriptors of the physician, (2) technical competence, (3) communication, (4) access to physician, (5) office staff/environment, and (6) coordination of care

	written by patients who report long-term relationships with their physicians.					
Ellimoottil[12]	To describe the landscape of online reviews of urologists by looking at a sample of ratings and written reviews from popular physician review websites.	Mixed methods. Quantitative - to look for differences in the number of submitted ratings by gender and size of city, and by census region. Qualitative	US	National	Ratings on 10 sites for 500 randomly selected urologists. Comments on one site (vitals.com) for the first 20% of sample who had ratings.	Most urologists are rated on at least one site. Most ratings and reviews are favourable, but composite scores are typcially based on small numbers. 53% of comments were considered *positive* or *extremely positive* (39% and 14% respectively).

		analysis - written comments categorised from extremely negative to extremely positive.				
Emmert & Meier[13]	To analyze all physician evaluations that were posted on the German PRW, jameda, in 2012. To provide descriptive analysis of (1) both physician and patient characteristics,	Quantitative. Descriptive.	Germany	National	127,197 ratings on Jameda of 53,585 physicians from 107,148 patients in 2012.	37% of all German physicians were rated on jameda in 2012. Mean rating was 2.37. 1/3 of all rated physicians were female and female physicians received sig better ratings than male physicians. Rating patients were mostly female (60%), between 30-50 years old (51%) and covered by statutory health insurance (83%). The most rated specialities were orthopaedists, dermatologists and gynaecologists. 2/3 of all ratings were 'very good'. Older patients gave better ratings than younger and those covered by private health insurance. no sig difference

	and (2) the number, distribution, and results of the ratings. To assess (3) the impact of physician and patient characteristics on the overall performance measure, and (4) the correlation between the number of ratings per patient/physician and the overall performance.					could be found between male and female patients.

Emmert et al[14]	To determine and structure the quantity and type of information about physicians in the outpatient sector provided on German-language physician rating websites.	Quantitative. Descriptive.	Germany	National	Eight physician rating sites were included: Jameda, Docinsider, Imedo, Esando, Die Arztempfehlung, Medführer, Sanego, Arztauskunft.	German physican rating sites contain a broad range of information mostly about structural quality (e.g. car parking, staff qualifications) and patient satisfaction/experiences. There is less information on process quality (e.g. waiting times) and outcomes (e.g. recommended by patients). Structural information can be trusted as it is verifiably factual, but other types of information, like patient satisfaction, are subjective and should be interpreted with caution, ideally with information about the patient context.
Emmert et al[15]	To explore the concerns of patients who commented on physician care and to address and enhance patient satisfaction.	Mixed methods. Qualitative framework analysis, quantitative descriptive statistics.	Germany	National	3,000 comments posted on Jameda in 2012. 1,500 were about GPs and 1,500 about specialists.	The majority (80%) of comments were positive, 16% negative and 4% neutral. Approx. one third of rated physicians were female. 60.9% of rating patients were female. Just over half were between 30-50 years and 85.2% had statutory health insurance. GP ratings were more likely to be favourable. Over half the comments were about the physician themselves (as opposed to other staff or about the practice). 9984 patient

						concerns were identified in the 3,000 comments. 80% were positive and 17% negative. Longer narrative comments were more likely to be negative and vice versa.
Emmert et al [16]	To present a comprehensive analysis of the ratings of dentists on a German physician rating website over a 2-year period.	Quantitative, correlation.	Germany	National	23,902 dentists rated by 72,758 patients on Jameda in 2012 and 2013.	Ratings for dentists increased by 65.08% and 44.57% of all dentists had been rated once between 2012-13. The majority of ratings were positive. Male dentists were more likely to be rated, but female dentists received better ratings. The majority (54.41%) of rating patients were female and female patients gave better ratings. Older people and those with private health insurance gave better ratings. Overall, dentists with a higher number of ratings also had better ratings.

| Emmert et al[17] | To estimate the current level of awareness and use of physician-rating websites in Germany and to determine their impact on physician choice making and the key predictors which are associated with the knowledge and the use of physician-rating websites. | Quantitative, cross-sectional survey. | Germany | | 1,505 respondents, mean age 43.73 years; 57.25%F. | 32.09% had heard of physician-rating websites and 25.32% had used one to search for a physician. 11.03% had posted a rating. 65.35% consulted a particular physician based on their ratings. 52.23% had not consulted a particular physician because of the publicly reported ratings. Females were more likely to be aware of such sites, in particular, those who were widowed, covered by statutory health insurance, and with higher health care utilization. |

Emmert et al[18]	to examine which health care providers use online rating websites and for what purposes, and whether health care providers use online patient ratings to improve patient care.	Quantitative, online-based cross-sectional survey	Germany		2,360 respondents (17.50% GPs, 69.36% specialists, and 13.14% other, eg, midwives); mean age 49.63; 66.67%M; mean duration of practice 12.99 years.	54.66% used online ratings to derive measures to improve patient care. Ophthalmologists and gynaecologists were most likely to implement measures. The most widely implemented quality measures related to communication with patients, scheduling appointments, and office workflow. Scaled-survey results had a greater impact on deriving measures than narrative comments.

| Frost[19] | To (1) evaluate the prevalence of orthopedic surgeon ratings on physician rating websites in the United States and (2) evaluate factors that may affect ratings, such as sex, practice sector (academic or private), years of practice, and geographic location. | Quantitative descriptive study | US | Regional | Numeric ratings and written reviews from 7 sites were collected for 557 orthopaedic surgeons selected from the 30 most populated US cities. | 94.3% were rated at least once on 1 of the sites. The average rating was 71.4. 7.4% were female and 92.6% male. 50.4% practiced in the South and Southeast, whereas 49.6% practiced in the West, Midwest, and Northeast. No significant difference based on sex or geographic location was noted. Most comments (64.6%) were positive or extremely positive. Physicians who were in practice for 6 to 10 years had significantly higher ratings than those in practice for 0 to 5 years or for 21 or more years. |

| Galizzi[20] | To explore the extent to which doctor rating websites are known and used among a sample of respondents from London. To understand the main predictors of what makes people willing to use doctor rating websites. | Quantitative cross-sectional study | England | Local | 200 individuals (55%F; 48% White British; 141 employed, 33 students; 46% had a university degree) from the Borough of Hammersmith and Fulham, London. | The use and awareness of doctor-rating websites are still quite limited. White British subjects, as well as respondents with higher income, are less likely to use doctor-rating websites. Aspects of the doctor–patient relationship also play a key role in explaining intention to use the websites. The doctor has both a 'complementary' and 'substitute' role with respect to Internet information. |

Gao[21]	To describe trends in patients' online ratings over time, across specialties, to identify what physician characteristics influence online ratings, and to examine how the value of ratings reflects physician quality.	Quantitative descriptive study.	US	National	Over 386,000 national ratings from 2005 to 2010 from RateMDs which included and provided insight into the evolution of patients' online ratings; physician demographic data from the US Department of Health and Human Services' Area Resource File.	Online physician rating is rapidly growing in popularity. They majority of existing reviews are positive. There are small, but statistically significant correlations between the value of ratings and physician experience, board certification, education, and malpractice claims, suggesting a positive correlation between online ratings and physician quality. The average number of ratings per physician is low, and most rating variation reflects evaluations of punctuality and staff.
Gao[22]	To provide one of the first analyses of how online ratings reflect physician quality as perceived by a broader	Quantitative correlation - <u>exact methods unclear</u>	US	National	Survey data from a consumer advocacy group, ratings from RateMDs.com, US census data, data from state medical boards on physicians'	Physicians who are rated lower in quality by the patient population are less likely to be rated online. Although ratings provided online are positively correlated with patient population opinions, online ratings tend to be exaggerated at the upper end of the quality spectrum.

					accreditation, licensing and disciplinary history.	
Gilbert[23]	To assess radiologist representation on rating sites.	Quantitative descriptive study.	US	National	1000 self-designated diagnostic radiologists representing 50 states.	19.7% were profiled, but only 2.4% were on 2 sites. Radiologists are underrepresented on such sites. Ratings were higher for radiologists than other staff.
Glover[24]	To examine the extent to which hospitals utilize social media and whether user-generated metrics on Facebook® correlate with a Hospital Compare® metric, specifically 30-day all cause	Quantitative. Retrospective cross-sectional study.	US	Regional	315 hospitals performing better than the national rate on 30-day readmissions. 364 hospitals performing worse than the national rate.	Better performing hospitals were more likely to use Facebook. The average rating for hospitals with low readmission rates was higher than for those with higher readmission rates. A one-star increase in Facebook rating was linked to increased likelyhood of the hospital having low readmissions.

	unplanned hospital readmission rates.					
Grabner-Krauter[25]	To explore how certain characteristics of physician reviews affect the evaluation of the review and users' attitudes toward the rated physician.	Quantitative survey. Randomised 2x2 between-subject factorial experiment. Moderated regression analyses and moderated	Austria	Unclear	168 participants. 69.9% female; average age 27.7 years. 36.7% students, 36.1% professionals, 6% other employment status, 21.1% working and studying.	6 % had written a physician review. 53% had never consulted a physician rating site. Number of reviews received, and perceived trustworthiness of the reviewer and credibility of the review influenced attitudes towards dentists. A higher number of reviews resulted in a more positive attitude towards rated dentists. Fact-oriented reviews were considered more favourable compared with emotional (e.g. containing expressive slang or humour) reviews when reviews were few in number.

						mediation analysis.				
Gray[26]	To measure the association between US physician website ratings and traditional quality measures (QMs) of clinical and patient experience.	Quantitative. Regression analyses.	US	National	1299 physicians who completed a practice improvement module. QMs and ratings of doctors on 8 free, public websites.	61% had been rated, with 5.6 ratings per doctor. Associations between ratings and clinical QMs was not significant, but there was a small, significant assocation with patient experience QMs.
Greaves et al[27]	To describe the frequency of tweets sent to hospitals in the English National	Mixed methods. Qualitative content analysis and	England	National	Random sample of 1,000 tweets sent to acute NHS hospital trusts with Twitter accounts in England	9.8% of tweets were related to quality of care care – and most of these related to patients' experience of interactions with staff. no correlation between the sentiment of tweets

	Health Service and to examine whether they contain information about quality of care. To compare sentiment on Twitter about hospitals with established survey measures of patient experience and standardised mortality rates.	sentiment analysis.			for one year from April 2012.	about hospitals and patient experience measure by traditional survey methodology

Greaves, Pape, King[28]	To describe patterns observed and analyse associations with unsolicited ratings posted on NHS Choices for all acute hospitals in England and conventional measures of patient satisfaction obtained through formal surveys. To compare the strength of associations between NHS Choices ratings and clinical	Quantitative. Cross-sectional observational study.	England	National	9,997 web-postings about 146 acute general NHS hospital trusts on NHS Choices and a comparison with patient survey data.	67.4% would recommend the hospital to a friend. Online ratings were correlated with survey measures of patient experience.

	outcomes and associations between patient survey measures of experience and clinical outcomes.					
Greaves, Pape, King[29]	To examine hospital-level associations between web-based patient ratings on the NHS Choices Website and objective measures of quality.	Quantitative. Cross-sectional observational study.	England	National	10,274 patient Web-based ratings of all (n=166) acute NHS trustsposted on the NHS Choices Web site from January 1, 2009, to December 31, 2010.	of those who offered a view about recommending, nearly 70% would recommend the hospital reviewed to a friend. Positive recommendations of hospitals were significantly associated with lower hospital standardized mortality ratios. Mean and median ratings of hospital cleanliness were 3.6 (range, 2.6-5.0) on a scale from 1 (dirty) to 5 (exceptionally clean). Better ratings of hospital cleanliness were associated with lower MRSA and C difficile infection rates.

Greaves, Pape, Lee[30]	To examine the usage of NHS Choices and associations between web-based patient ratings and conventional measures of patient experience and clinical quality in primary care.	Quantitative. Cross-sectional observational study.	England	National	9,997 patient web-based ratings of 146 acute NHS trusts posted on the NHS Choices website during 2009/2010.	Web-based ratings of patient experience were associated with ratings derived from a national paper-based patient survey. Associations with clinical outcomes were at least as strong for online ratings as for traditional survey measures of patient experience
Greaves, Ramirez-Cano[31]	To use machine learning to understand patients' unstructured comments about their care.	Quantitative. Sentiment analysis.	England	National	6,412 online comments about hospitals on NHS Choices in 2010.	There was 81%, 84%, and 89% agreement between quantitative ratings of care and free-text comments for cleanliness, being treated with dignity, and overall recommendation of hospital respectively. We observed mild to moderate associations between our machine learning predictions and responses to the large

						patient survey for the three categories examined.
Hanauer[32]	To understand, within the context of other types of rating sites, parents' awareness, perceptions, and use of physician-rating sites for choosing primary care physicians for their children.	Quantitative. Cross-sectional, nationally representative survey.	US	National	Substudy reporting on 1,619/2,137 respondents who are parents. 1,619 parents with $\geq$ child aged <18 years.	Parents are beginning to use online ratings sites to choose physicians for their children. 74% were aware of rating sites and 28% had used them in the previous year. 6% reported posting ratings, the majority of which were positive. Of those who had used rating sites, 30% based physician choice on postive ratings/reviews and 30% avoided physicians based on negative ratings. Online ratings were reported to be more important to women and to younger parents. Overall, rating sites were least commonly endorsed as important sources of information.

| Hanauer[33] | To survey a nationally representative sample of the US population about their knowledge and use of online ratings for selecting a physician for themselves. | Quantitative, experimental 5x2 factorial design. | US | National | 2,137/3,563 respondents. 52%F; 68% white/non-Hispanic; 21% aged 18-29, 17% 30-39, 18% 40-49; 19% 50-59, 26% ≥ 60 years. | 59% said rating sites were "somewhat" or "very important" when choosing a physician, although they were endorsed less frequently than other factors (word of mouth). Accepting health insurance was rated "very important". Awareness of online physician ratings was lower than for other consumer goods. Among those who sought online physician ratings in the past year, 35% reported selecting a physician based on good ratings and 37% had avoided a physician with bad ratings. For those who had not sought online physician ratings, 43% reported a lack of trust in the information on the sites. Participants were also asked to consider the implications of leaving negative comments about a physician; 34% had concerns about their identity being disclosed and 26% were concerned about the physician taking action against them. |

Hao[34]	To examine and describe online doctor reviewing in China.	Quantitative. Descriptive statistical study.	China	National	Dataset of reviews collected from 2006-2014 from the Good Doctor website, haodf.com.	37% of doctors and almost all medical specialities had been reviewed. The majority of reviews were positive even though they were anonymous. Obstetricians and gynaecologists were most likely and internal medicine doctors were least likely to be reviewed.
Hao[35]	To automatically extract hidden topics from Web-based physician reviews using text-mining techniques to examine what Chinese patients have said about their doctors and whether these topics differ across various specialties.	Quantitative. Descriptive statistics and Latent Dirichlet Allocation.	China	National	All reviews from 'the good doctor' platform from 2006-2014 were explored using descriptive statistics. LDA was applied to more than 500,000 textual reviews for over 75,000 Chinese doctors across four major speciality areas.	112,873/314,624 doctors had been reviewed. 2/3 of those in the four specialities had received >two reviews and some >500. The most popular topics in the reviews were finding doctors, technical skills and bedside manner, general appreciation, and description of various symptoms.

Hawkins[36]	To assess the use of Twitter as a supplemental data stream for measuring patient perceived quality of care in US hospitals and compare patient sentiments about hospitals with established quality measures. To provide a current characterisation of US hospitals on Twitter, explore the unsolicited patient	Quantitative. Machine learning approach/ sentiment analysis.	US	National	404,065 tweets to 2,349 hospitals.	Roughly half of the hospitals in the US have a presence on twitter, but only 9% of tweets directed at hospitals related to patient experience (the rest focused on other hospital related topics). On the whole the sentiment of tweets was positive towards hospitals.

	experience topics discussed by patients, and determine if Twitter data are associated with quality of care, as compared with other established metrics.					
Hopper[37]	To test the usefulness of sentiment analysis and time-to-next-complaint methods in quantifying text-based information located on the internet.	Quantitative. Sentiment analysis.	US	Local	895 comments on 70 gynecologists in Virginia on RateMDs.	188 comments were complaints, but these were rare - 1 per 410 days and only three doctors had $\geq$10 complaints. Sentiment analysis and time-to-next-complaint techniques might be useful tools for transforming web-based text into meaningful, quantifiable information.

Jans[38]	To find out how many patient ratings are necessary to outweigh an expert opinion's impact on the decision making process.	Quantitative. Experiment.	The Netherlands		107 participants, mean age 41, 86.4% employed.	Expert ratings are perceived more highly, but the trustworthiness of a source is more important in making decisions about healthcare providers than its level of expertise. Hospitals are evaluated more positively when the expert rating is positive and the patient rating is negative than *vice versa*.
Johnson[39]	To survey physician leaders' about their perceptions of rating systems, measuring performance and the quality of individual doctors.	Quantitative. Survey.	US		730/5,624 American College of Physician Executives (ACPE) members primarily working in hospitals, health systems and group practices. Conducted in October and November 2013.	Physicians were skeptical of ratings collected by external agencies, although they viewed these more favourably than online ratings. They thought ratings were here to stay and that use of online ratings by patients was low. 39% agreed with their online rating and 42% partially agreed. 19% did not agree. 21% didn't check online ratings because they didn't think patients used them. 12% thought online consumer websites were helpful.

Kadry[40]	To (1) determine the most frequently visited physician-rating websites with user-generated content, (2) evaluate the available information on these websites, and (3) analyze 4999 individual online ratings of physicians.	Quantitative, descriptive evaluation.	US	National	10 most commonly visited physician sites in the US (using google trends): Health Grades. Com; Vitals.com, Yelp.com, YP.com, RevolutionHealth.com, RateMD.com, Angieslist.com, Checkbook.org, Kudzu.com, and ZocDoc.com.	A total of 35 dimensions of care were rated by patients. the average rating per physician was 77 out of 100. patient's single overal rating correlated with the other dimensions of care rated by pts for the same dr.
Kanouse[41]	To examine the effects of providing patient comments along with standardized performance	Quantitative. Experimental design.	US	National	A random sample of working-age adults (n=848) from an online panel representing the noninstitutionalized	Patients spent more time on sites containing patient comments and were less likely to choose the doctor scoring highest on standardised measures. Therefore, comments reduced attention to standardised measures and increased the likelihood of 'suboptimal choices'.

	information in a web-based public report.				population of the USA.	
Kilaru[42]	To characterise the content of online reviews and explore their perspectives on US emergency department (ED) care.	Qualitative. Modified grounded theory.	US	National	Unstructured publicly available reviews on YELP describing experiences of ED care, using HCAHPS themes as coding framework.	1/3 of reviews on YELP included experiences of ED care. The reviews contained several themes assessed by the HCAHPS survey, including communication with nurses, communication with doctors, and pain control. The reviews also contained key themes specific to emergency care: waiting and efficiency; decisions to seek care in the ED; and events following discharge, including administrative difficulties

Kinast[43]	To identify the reasons why patients write positive and negative online reviews of ophthalmologists.	Quantitative. Logistic regression.	US		595 online reviews from 60 ophthalomogists.	72% of all comments were positive, the most common categories for positive comments were technical competence, interpersonal manner and office staff. The most common categories for negative comments were office staff, office finances/ costs , office wait time. Negative comments were more likely to be related to office factors than physician factors. Reviews that mention the physician had a higher score than those who did not. Factors most predicitve of review score were negative technical competence, negative office staff negative costs. Bimodal distrubtion of scores.
Kleefstra[44]	To explore whether and how patient reviews of hospitals, as reported on rating sites, have the potential to contribute to	Qualitative. Semistructured interviews; inductively analysed.	The Netherlands	National	10 senior inspectors from 10 different areas. Negative reviews from a hospital under their supervision.	Feedback sites may be valuable in supervising hospital care. Inspectors were initially reluctant to use rating sites in their supervision, mainly because they were concerned about representativeness, subjectivity and relevance. 23% of negative reviews were deemed relevant for risk identification.

	health care inspector's daily supervision of hospital care.					
Lagu[45]	To describe the structure and content of physician-rating websites and to assess the extent to which a patient might find them valuable.	Quantitative descriptive study.	US	Local	33 physician websites identified via google search. 300 Boston physicians were searched for.	33 physcian rating websites were identified, these contained 190 reviews for 81 physicians, which suggests that 70% of physicians did not have a review on any of the sites. The majority (88%) were positive, 6% were negative and 6% neutral. Several narratives were found and appeared to be written by physicians for each other.
Lagu[46]	To better understand the content of narrative feedback and determine how it might complement other	Mixed methods. Descriptive statistics and directed qualitative content analysis.	England and US	National	Reviews of 264 hospitals that provide general or subspeciality medical care (not psychiatric, dental or homeopathic) registered on NHS	The majority of patients would recommend their hospital to others. The majority felt they were treated with dignity, that the hospital was clean and that staff worked well together. 83% of reviews were positive, but 76% contained at least one negative comment. Key themes concerned technical care, the facility itself, waiting times, staff and communication.

| | | | | | Choices from 2010-11 were included.Hospitals with fewer than 10 reviews were excluded. 200 randomly selected reviews of 20 of the hospitals were included. | Hospitals replied to more than half of the reviews and of these, 36% were positive. Online reviews could supplement existing measures of patient feedback, like the HCAHPS and offer an opportunity to show hospitals responsiveness to patient concerns. |
| Lagu[47] | To determine if it is feasible to use social media platforms for learning about and improving hospital quality. | Mixed methods. Exploratory study using qualitative content analysis and descriptive statistics. | US | Local | Solicited patient narratives on a hospital Facebook page. 47 comments by 37 respondents (32F, 5M). | Comments were about staff, specific departments, technical aspects of care, and the physical environment. Quality improvement targets were identified, but the insight was similar to that gathered in other ways. |

The first row (continuation) column contains: forms of publicly reported quality data, like patient experience data collected by the HCAHPS

Lewis[48]	To characterize the online presence of plastic surgeons in Southern California as portrayed by physician rating websites (PRWs).	Quantitative descriptive study.	US	Regional	An extensive online database of board-certified plastic surgeons was used to generate a list of surgeons within a 50-mile radius of Pomona, CA. Ratings on websites HealthGrades.com, Vitals.com, and UCompareHealthcare.com were used.	Plastic surgeons in Southern California have an online presence that can be influenced by their patients. 263 surgeons were evaluated and 97% were rated on at least 1 of the 3 PRWs chosen. In general, surgeons were rated highly. The median number of total reviews was 25.
Li[49]	To examine how the proportion and position of negative reviews on such websites influences readers' willingness to	Quantitative. Experimental 5x2 factorial design. Questionnaire.	US		500 participants, 52%F, 52% white, mostly under 40 years old, college educated and earning less than 40,000USD/year.	An increase in the proportion of negative reviews led to a reduced willingness to use the physician's services. A primacy effect was found for negative reviews: readers were less willing to use a physician's services when negative reviews were presented before positive reviews, rather than after.

	choose the reviewed physician.					
Lopez[50]	To explore the content of Internet reviews about primary care physicians.	Qualitative. Content analysis.	US	Regional	Purposive sample of patient reviews on RateMDs.com and Yelp.com about primary care (internal medicine and family medicine) physicians practicing across four cities from different geographical regions in urban America - Atlanta, Chicago, New York, San Francisco. 100/712 reviews selected.	The majority of reviews are positive and focus on physicians' interpersonal manner and technical competence, and systemic issues related to the practice, e.g. waiting times.

MacDonald[51]	To determine how the public views dental care in Quebec.	Mixed methods. Exploratory study using descriptive statistics and qualitative thematic analysis.	Canada	Local	Random sample of 86 comments about 47/750 dentists in 2011 was extracted from RateMDs.	Majority of comments (83%) were positive and focused on patient-centred communication, competence and professionalism. Negative comments concerned poor communication, incompetence and unprofessional conduct.
McCaughey[52]	To examine the relationship of social media channel utilization (activity on blogs, content communities, and social networking sites, plus posting a social media policy) by health	Quantitative descriptive study.	US	National	A convenience sample of 106 national U.S. hospitals selected from the U.S. News and World Report's Best Hospitals Report (2011); social media data gathered from the websites of the sample hospitals; patient ratings of hospital service	Social media channel utilization was found to be positively related to both patient overall rating of hospital and patient willingness to recommend hospital. Using more social media channels is linked to higher scores from patients.

	care organizations and the brand rating of those organizations, as measured by patients who have completed the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey.				retrieved through the U.S. Government Medicare Hospital Compare website.	
Merrell[53]	To help physicians and allied health professionals explore the vast	Quantitative. Descriptive study	US	National	35 physician evaluation sites.	Sites are free to use, have no overt geographical focus and allow patients to post anonymously. Some allow responses from providers. Most users are 45-64 years and usually female with

	array of PEWs, to identify promising websites, and to enhance their practices.					some college qualifications and they usually use the sites at work.
Nakhasi[54]	To explore whether Twitter is a relevant data source to learn about patient safety and capture the patient's voice.	Qualitative content analysis (although this was not specified).	USA(Tweets most likely to be from US.)	National/International	1,006 Tweets pertaining to patient safety.	83% identified the type of error of which 26% were procedural errors, 23% medication errors, 23% diagnostic errors, and 14% surgical. 84% identified a tweet source: 90% were patients; 9% family members. 52% identified an emotional response: 47% expressed anger or frustration, 21% humor or sarcasm, 14% sadness or grief. 6.3% of tweets mentioned an intent to pursue malpractice litigation.

Patel[55]	To explore and describe general practitioners' attitudes toward online patient feedback, specifically their concerns.	Qualitative, descriptive.	England	Regional	20 GPs. Cambridgeshire, London and Northwest England.	The majority of GPs had concerns about online patient feedback. They questioned its validity because of data and user biases and lack of representativeness, its usability due to the feedback being anonymous, its transparency because of the risk of false allegations and breaching confidentiality, and the resulting impact of all those factors on them, their professional practice, and their relationship with their patients. Recommendations for practice include promoting online feedback among GPs, convince and reassure about their value and consider changes to feedback websites.
Patel[56]	To explore patients' views toward giving Web-based feedback and ratings to general practitioners	Qualitative. Semistructured interviews; thematic analysis.	England	Local	Purposive sample of 18 participants of different age groups in London and Coventry.	Half of the participants were not aware that they could leave feedback for GPs. The majority did not consider feedback necessary and thought it would not be used by GPs. Those in favour said they could do it remotely, share it publicly and perceived that it would be taken seriously by doctors. Those against raised

	(GPs), within the context of other feedback methods available in primary care in England, and in particular, paper-based feedback cards.					concerns about accessibility, privacy, security and thought online feedback could be ignored.
Paul[57]	To propose a joint probabilistic model that captures both the sentiment and aspects latent in the free text of online provider reviews. To elucidate the factors that most affect consumer	Quantitative. Sentiment analysis. A probabilistic joint model of topic and sentiment based on factorial Latent Dirchlet Allocation.	US	Unclear	Two datasets: a set of 842 online reviews annotated along three clinical dimensions, or aspects; a dataset of 52,226 reviews (average 55.8 words) downloaded from RateMDs.com.	Our experimental results have demonstrated the quality and predictiveness of this new model. Quantitatively, we showed that our model is much more predictive of aspect ratings than alternative models, and qualitatively we verified that the model is learning sensible (topic, sentiment) pairs

	sentiment regarding interactions with their doctor.					
Ranard[58]	To compare the content of all Yelp narrative reviews of hospitals to domains of the HCAHPS survey. To identify which Yelp topics best correlated with positive or negative Yelp review ratings	Quantitative. Latent Dirichlet Allocation (a type of natural language processing) and correlations.	US	National	HCAHPS survey data from July 2012–June 2013 and Yelp reviews.	Hospitals with at least 3 reviews had mean ratings that correlated wtih a HCAHPS item about overall hospital rating. Yelp reviews include more topics than HCAHPS - an additional 12 domains were found. The majority of topics that most strongly correlate with positive or negative reviews are not measured or reported by HCAHPS.

	and to correlate Yelp ratings with the HCAHPS survey overall ratings.					
Rastegar-Mojarad[59]	To create a corpus of patient experience (COPE) and report descriptive statistics to characterize COPE.	Quantitative. Natural Language Processing.	US	National	26 healthcare-related categories (e.g. hospitals) were used to extract 6914 reviews on Yelp.	COPE contains 79,173 sentences from 6914 patient reviews of 985 health care facilities near 30 universities in the United States. Patients wrote longer reviews when they rated the facility poorly (1 or 2 stars). Computed sentiment scores correlated well with consumer-generated ratings. A consumer vocabulary to describe their health care experience was constructed by a statistical analysis of word counts and co-occurrences in COPE.

Reimann[60]	To examine the extent to which PRSs currently represent the constructs of patient experience and satisfaction as measured by research instruments.	Mixed methods. Quantitative; qualitative content analysis.	Germany and US	International	Physician rating sites in English-language and German-language found using systematic searches conducted on Google and Yahoo.	The dimensions for patient experience and satisfaction most frequently represented in PRSs included diversely operationalized ones such as professional competence and doctor-patient relationship/support. However, other less complex but nevertheless important dimensions such as communication skills and information/advice were rarely represented, especially in English-language PRSs
Riemer[61]	To investigate patterns of ratings of dermatologists on commonly used PRSs to better understand the information available to patients online.	Quantitative. Exploratory study.	US	National	Ratings for 100 dermatologists (55M and 25 had subspecialties) randomly selected from the American Academy of Dermatology. USA on ZocDoc, Yelp,	Individuals appeared on approximately 2 websites. Mean ratings were high across all sites. No significant differences were found between the ratings on the 3 sites with the most profiles of dermatologists. Neither sex nor specialty training had significant effects on mean ratings. Four of the 5 websites offer the option for users to write comments. Only 1 website (ZocDoc.com) had significantly

					RateMDs, Vitals and Healthgrades.	fewer negative comments than the other websites.
Rothenfluh[62]	To explore the extent to which consumer decision-making based on Web-based reviews is the same for consumer services (ie, choice of a hotel) and health services (ie, choice of a	Qualitative. Semistructured interviews; thematic analysis.	Switzerland	Local	Purposive sample of 22 parents, aged 26-40 years from the German-speaking part of Switzerland.	Participants spent 9:57 minutes searching for a hotel and 6:17 searching for a paediatrician. Looking for a paediatrician was easier than looking for a hotel, although it was deemed more important. Main themes: trial and error; trust; competence assessment; affect and likeability.

	pediatrician), while providing an in-depth understanding of potential differences or similarities.					
Samora[63]	To understand the ethical and professional implications of physician behavior changes secondary to online physician-rating Web sites (PRWs).	Quantitative. Survey.	US	National	314/2,664 active members of the American Society for Surgery of the Hand who practice in both private and academic settings in the United States.	>65% had an unfavourable opinion of PRWs. 34% had created/updated a profile on a site. A third had solicited favourable reviews from patients and 3% had paid to improve their ratings. Most did not feel ratings had an influence on practice.

| Segal[64] | To determine if surgeon volume, as a proxy for clinical outcomes and patient safety, correlates with online reputation. | Quantitative. Descriptive study. | US | National | The numerical ratings and comments on 9 online review websites for n=600 high- and low-volume surgeons for three procedures were investigated: lumbar surgery, total knee replacement, and bariatric surgery. Websites: Avvo, HealthGrades, RateMDs, Vitals, Citysearch, InsiderPages, Yahoo! Local, Google Maps, and Yelp. | Online review websites provide a rich source of data that may be able to track quality of care, although the effect size is weak and not consistent for all review website metrics. Numerical ratings were found for 91.2% of physicians in our sample and comments were found for 64.2%. We found that high-volume surgeons could be differentiated from low-volume surgeons independently by analysing: the total number of numerical ratings, the total number of text comments, the proportion of glowing praise/total comments about quality of care and the proportion of scathing criticism/total comments about quality of care. |

Shepherd[65]	To ascertain how social media users with experience of mental disorder relate to each other and the social space during internet based interactions and to uncover the potential role of resources such as Twitter for the provision of feedback on and engagement with mental health service user experience.	Qualitative. Content analysis	UK	National	Tweets related to the hashtag #dearmentalhealthprofessional.	The majority of the content related to four over-arching themes: The impact of diagnosis on personal identity and as a facilitator for accessing care; Balance of power between professional and service user; Therapeutic relationship and developing professional communication; and Support provision through medication, crisis planning, service provision and the wider society. It was concluded that Twitter was a potential source for feedback about health service provision.

| Smith[66] | To identify qualitative themes associated with patient reviews of dermatologic care on consumer reporting websites. | Mixed methods. Qualitative; inductive analysis of reviews. Quantitative. One-way ANOVA. | US | Regional | 518 Yelp reviews of 45 practices and 4921 from from ZocDoc of 45 practices, based in Philadelphia, Houston and Seattle from Jan-Jul 2015. | Higher ratings were found on ZocDoc than Yelp. Themes related to doctors: temperament, knowledge and competency, physical examination, communication ability, and consideration of cost. Practice-related themes: scheduling, temperament, cleanliness, waiting room and insurance. Negative comments concerned difficult interactions with staff, problems with scheduling, cleanliness and insurance issues. Patients reported using websites to find providers. |

Sobin[67]	To evaluate patterns in online ratings of otolaryngologists.	Quantitative. Descriptive and comparative study.	US	Regional	Faculty lists for academic programmes (otolaryngology) in the North Eastern US. Faculty members names were then searched for ratings on Healthgrades and vitals websites. Each physician's profile on websites was reviewed for State, program, academic position, years in practice, subspecialty,ratings, and reviews (negative and positive).	281 faculty members at 25 programs were identified. The vast majority (over 90%) had an online profile on either of the two rating websites. And between 69% and 81% had patient reviews. Facial plastics had the highest number of reviews/ comments. (but not stat sig) 27% of comments were neg. and nearly half of all otolaryngologists in the sample had at least one neg comment. Assoc Prof received lower scores than prof/ ass prof (stat sig), laryngology received higher ratings than facial plastics (stat sig)

Speed[68]	To examine the ways in which anonymity and its attendant risks and dangers are conceptualised on different sides of the NHS/community relationship (either from the perspectives of the professions or the perspective of patients and members of the public).	Qualitative thematic analysis, semistructured interviews.	UK		41 semistructured interviews with bloggers, patient representatives, and NHS managers and clinicians involved in commissioning.	Patients feel anonymity is important for effective feedback, but professonals see it as a barrier. Patients worried that identification could compromise future care. Professionals worried about reputational damage.
Sundstrom[69]	To examine the role of health as a connective narrative among	Qualitative content analysis.	US	National	2003 blog posts.	Bloggers discussed finances, obtaining care, lack of accessible care. One of the themes pertained to the quality of health care. Bloggers believed the medical system used patients to

	individuals organizing collectively in an online community. The "We are the 99 percent" Tumblr blog emerged as a spontaneous community platform of the Occupy Wall Street movement in the US.					make money - the overuse of medical services and technologies was increased the price of care, and led to unnessary, costly and possibly dangerous treatments.
Terlutter[70]	To analyse patients' knowledge and use of PRWs; describe users and nonusers in terms of	Quantitative. Survey.	Germany	National	986/1,006 randomly selected German patients. 46% female. 44% chronic illness.	Sociodemographic variables (gender, age, education) and health status alone did not predict whether persons were prone to use PRWs or not. 29.3% of the sample knew of a PRW and 26.1% had already used a PRW. Younger people were more prone than older ones to use PRWs. Women used them more

| | sociodemographic variables, psychographic variables, and health status; and assert whether these variables can also serve as predictors of usage and nonusage of PRWs. | | | | | than men, the more highly educated more than less educated people, and people with chronic diseases more than people without. No differences were found between users and nonusers in their daily private Internet use and in their use of the Internet for health-related information. Users had more positive feelings about the Internet and other Web-based applications in general than nonusers, and they had higher digital literacy. Users ascribed higher usefulness to PRWs than nonusers and users trusted information on PRWs to a greater degree than nonusers. Users were also more likely to rate a physician on a PRW in the future and to use a PRW in the future. Higher education, poorer health status, higher digital literacy (at the 10% level of significance), lower importance of family and pharmacist for health-related information, higher trust in information on PRWs, and higher appraisal of |

						usefulness of PRWs served as significant predictors for usage of PRWs.
Thackeray[71]	To establish the frequency of various forms (eg, spectators, creators, or critics) of online health-seeking behaviors; identify correlates of 2 health-related online activities: (1) using SNS for health-related activities, and (2) consulting online user-generated content for answers about	Quantitative. Telephone survey.	US		1,745 adults (18 years and older, spoke English) who reported using the internet for health-related information. August - September 2010. 56% female, 79% white, 39% college graduates, 29% household income between $75k-$150k, 87% had health insurance.	Respondents consulted online rankings or reviews (41.15%), posted reviews (9.9%1), and posted a comment, question, or information (15.19%). Respondents with a chronic disease were nearly twice as likely to consult online rankings. Lower odds of consulting online reviews were associated with less formal education and being male. Respondents with higher incomes were 1.5 times as likely to consult online rankings or reviews than respondents with a regular provider, or living in an urban/suburban location.

	health care providers, health facilities, or medical treatment.					
Timian[72]	To ascertain if Facebook "Likes" are associated with hospital quality and patient satisfaction.	Quantitative. Exploratory.	US	Local	82 hospitals within 25 miles of New York found on the HHS hospital compare website.	40/82 hospitals had a Facebook page. Facebook 'likes' have a strong negative statistically significant association with 30-day mortality rates and are positively associated with patient recommendation.

Trehan[73]	To evaluate factors associated with positive online patient ratings and written comments regarding hand surgeons.	Quantitative. Exploratory study.	US	National	Random sample of 250 hand surgeons from the American Society for Surgery of the Hand.	98% had at least one rating among the three sites. Positive overall ratings was associated with higher number of ratings, Castle Connolly status and increased online presence. Surgeons with less experience were more likely to be rated on HealthGrades. There was no link between mean overall ratings for surgeons and age, sex, practice type or geographical region. 88% had a professional website, 45% had a professional Facebook page, 20% had a professional Twitter account.
van de Belt[74]	To identify the added value of social media for two types of supervision by the Dutch Healthcare Inspectorate (DHI), the regulatory body	Mixed methods. Exploratory study	The Netherlands	National	Social media sources, Twitter, Facebook and rating sites.	Social media could be used to include the patient perspective in supervision of quality and safety and the rating site, ZorgkaartNederland was the only source that provided information valuable to the DHI. Relevant information for six of forty incidents and provided relevant additional information in 72 of 116 cases in risk-based supervision of long-term elderly care.

	charged with supervising the quality and safety of health care services in the Netherlands.					
van Velthoven[75]	To identify the self-reported behaviour of the public in reading and writing online feedback in relation to health services.	Quantitative. Face-to-face cross sectional survey	UK	National	2036 participants	Of 1824 internet users, 42% had read online health feedback and 8% had provided it. Frequent internet use was associated with providing feedback and reading it was associated with factors including being younger, female and having a higher income, and experiencing a health condition. Motivation to read wsa to find out about treatments or tests and choosing a provider. Motivation to write was to inform others, provide praise or improve services.

Wallace[76]	To demonstrate show how the proposed state-of-the-art probabilistic model, that jointly captures latent aspects and sentiment, can leverage a small amount of data annotated by experts to guide topic/sentiment discovery.	Quantitative. Probabilistic model based on factorial Latent Dirichlet Allocation.	US	National	60,000 physician reviews on RateMDs.	Model output correlates with state-level measures of quality healthcare, including patient likelihood of visiting their primary care physician within 14 days of discharge (p=0.03), and using the proposed model better predicts this outcome (p=0.10). We find similar results for healthcare expenditure. Generative models of text can recover important information from online physician reviews, facilitating large-scale analyses of such reviews.
Yaraghi[77]	to measure the relative importance of Web-based quality ratings from	Choice-based experiment	US	National	1000 Amazon Mechanical Turk users	Ratings found on commercial websites were perceived as as important as clinical ratings provided by government websites for choosing a provider.

	governmental and commercial agencies on individuals' choice of primary care physicians					
Zhang[78]	To analyse negative online reviews about physicians; to identify potential ways to improve patient satisfaction and patient-doctor relationships	Content analysis	China	National	3012 negative comments about 1029 physicians from 5 high-ranking hospitals in Beijing were extracted for content analysis.	Patients who post negative comments are not alike and complaints cover a wide range of issues. Particular groups of people (e.g. those accompanying older patients or children) were shown to demonstrate little tolerance for poor medical service.

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