Health Information Technology Department
Mashhad University of Medical Sciences

In the name of God

Mashhad University of Medical Sciences

STRATEGIES FOR IMPROVING PHYSICIAN DOCUMENTATION IN THE EMERGENCY DEPARTMENT: A SYSTEMATIC REVIEW

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ABOUT THE JOURNAL

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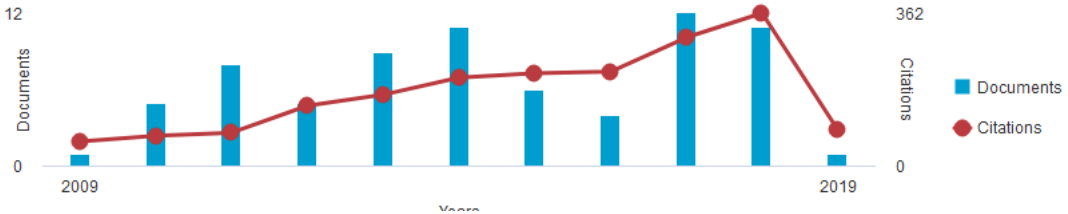

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INTRODUCTION

1) **Chart accuracy** is both a measure and **a means of ensuring the quality** of the care that patients receive.

2) **Previous research** suggests that **considerable variation** exists **in the quality of physician documentation.**

INTRODUCTION (CONTINUE)

4) **Emergency Departments (ED)** are characterized by *frequent staff changes*, *high activity levels*, *overcrowding*, *frequent interruptions*, *time pressures*, *uncertain patient arrival patterns*, and *a wide variety of case presentations.*

5) In such environments, there is **a pressing need** for methods **to better promote the recording** of *accurate* and *complete* patient care information.

6) In recent years, **EMR systems** have been introduced into many EDs to facilitate the documentation of patient care episodes, **but the quality of data in EMR systems remains variable.**

INTRODUCTION (CONTINUE)

7) Since **EMR** information is "**necessarily documentation dependent**", **strategies** to **enhance the quality of physician documentation** can impact the *accuracy*, *comprehensiveness*, and *usability* of EMR records.

8) Further, as many emergency departments continue to rely on **paper or hybrid charts**, there is a broader need to identify and adopt **effective approaches** to **documentation improvement** that are not exclusively EMR-dependent.

9) **Such approaches** may include: *physician education*, *templates*, *dictation*, and *scanning of free-text paper notes into EMRs*.

INTRODUCTION (CONTINUE)

10) The extent to which these and other interventions **can improve documentation quality**, particularly in the context of EDs, **is, as yet, unclear**.

11) Thus, the **objective** of this study was to **conduct a systematic review** of the **effectiveness of interventions** to **improve the quality of ED physician documentation in emergency settings**.

METHODS

SEARCH STRATEGY

1) The **Cochrane** Library, **DARE Database** of Reviews of Effects, **EMBASE**, **MEDLINE**, **PubMED**, and **Web of Science to March 2015** to identify relevant **English and French language** peer reviewed literature suitable for inclusion in this review.

2) Sources of **grey literature**, including the University of York's Health Technology Database, Current Controlled Trials Register and the websites of government and professional organizations, were similarly searched.

3) We also scanned the **reference lists** of included studies and review articles to identify additional studies of relevance to this review.

METHODS

SEARCH STRATEGY

4) This review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (**PRISMA**) guidelines.

5) The protocol for this review **has not been registered in PROSPERO** or any other publicly accessible registry.

METHODS

SEARCH STRATEGY

6) Search strategies combined **search terms** from two themes:

A. **physicians** (including but not limited to: *clinician*, *physician*, *doctor*, *house officer*, *intern*, *resident*, *medical student*).

B. **documentation** (including but not limited to: *administrative data*, *clinical coding*, *documentation*, *hospital record*, *medical chart).*

METHODS

STUDY SELECTION

1) **All abstracts** were **screened** in duplicate, for inclusion in the full text review.

2) **Three authors independently screened the full texts of** all selected abstracts.

3) During both screening stages, **disagreements** were **resolved** through **consensus**.

METHODS

STUDY SELECTION

inclusion criteria

1) Studies were **included** if they reported on **the results of any intervention** to **improve physician documentation** in **emergency settings.**

exclusion criteria

2) Studies were **excluded** if they:

- were **descriptive** studies or **case reports,**
- reported only **post-intervention results**,
- focused on **populations other than physicians, residents or medical students,**
- centered on **education to improve** history taking, patient care for specific medical conditions, verbal communication skills, or the documentation of non-chart data,
- focused on documenting or evaluating **student performance.**

METHODS

ASSESSMENT OF STUDY QUALITY

1) **Two authors independently** assessed the **quality of included studies**.

2) By using **the Downs and Black checklist** of **27 quality criteria** for randomized and non randomized designs.

METHODS

ASSESSMENT OF STUDY QUALITY

- **Downs & Black (1998)** do not explicitly refer to public health practices; however, they do state that the "**Checklist for Measuring Quality**" could be applied to any study **detailing a health care intervention**. Therefore, this instrument is applicable to the critique of studies involving public health interventions.
- Addresses the increasing demand for the use of **evidence from systematic reviews and meta-analyses** to support program and policy decisions in public health decision-making. This tool can be used to **assess the quality of original or primary source research articles** and to synthesize evidence from quantitative studies for public health practitioners, policy makers and decision-makers.
- Administration of the tool can happen either **within a systematic review process**, or as a quality **assessment tool for individual articles**. Within a systematic review, a group guides the review and one or two people administer the tool.

METHODS

ASSESSMENT OF STUDY QUALITY

- The "Checklist for Measuring Quality" is discussed in a three page article and **contains 27 'yes'-or-'no' questions across five sections**. The tool is easy to use and provides both an overall score for study quality and a numeric score out of a possible 30 points. The five sections include questions about:

1. **Study quality (10 items)** – the overall quality of the study;
2. **External validity (3 items)** – the ability to generalize findings of the study;
3. **Study bias (7 items)** – to assess bias in the intervention and outcome measure(s);
4. **Confounding and selection bias (6 items)** – to determine bias from sampling or group assignment;
5. **Power of the study (1 items)** – to determine if findings are due to chance.

METHODS

DATA EXTRACTION

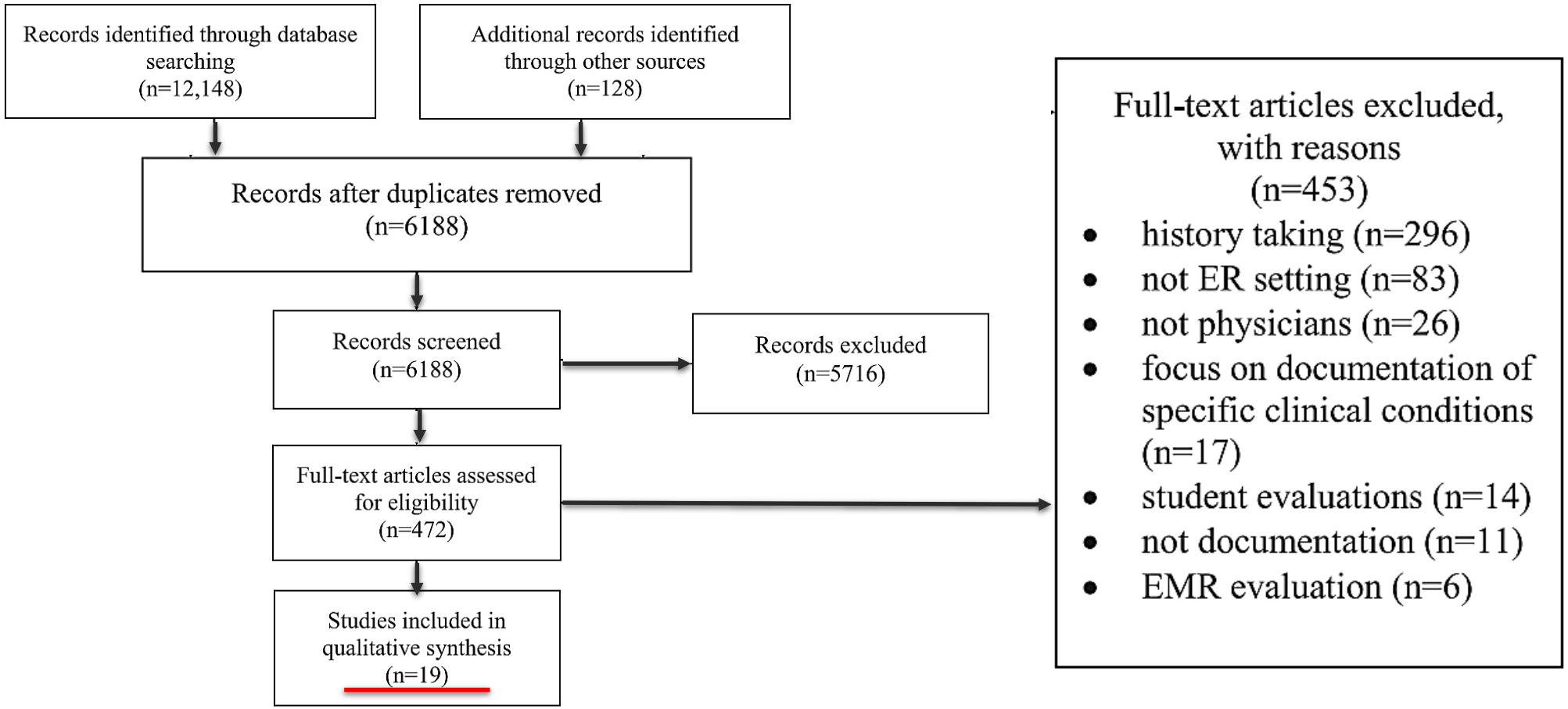
1) **Four authors jointly** extracted **data from all included studies** into a standardized form created **in Excel.**

2) **Outcomes of interest** included: documentation *accuracy*, *clarity* (*understandability*), *legibility*, *completeness*, *presence*, and *timeliness*.

3) Due to the **heterogeneity** of **study designs**, and **outcomes**, it **was not possible to pool the data** from included studies.

RESULTS

PRISMA FLOW DIAGRAM



RESULTS

CHARACTERISTICS OF INCLUDED STUDIES

Table 1 Characteristics and Outcomes of Included Studies

Author Date Country	Study design[a]	Setting Participants	Intervention(s) Duration	Intervention & Control Group Details	Outcomes of Interest	Results	Downs & Black Quality Score
Carter et al. USA (2009)	PPN	• Teaching hospital • Residents (R2, R3)	Multiple Intervention (audit/feedback, education, and reminders) 12 weeks	Intervention group $n = 24$ 1-h lecture to 18/24 residents Pocket card and lecture handouts to 24/24 residents and biweekly newsletters. Physicians received weekly case specific chart audit/feedback. Control group (n = 24) Usual electronic documentation program	• Chart level, based on complexity of decision making and detail of history and physical. • RVU (relative value units). • Billings/hr.	• Intervention resulted in more complex charting (27% vs 19%, $p < .01$) and fewer mid-level charts ($p < .01$). • RVUs increased with intervention (3.71 vs 3.17, $p < .01$). • Billings increased with intervention ($354.08 vs $303.79, $p < .01$).	19/27

RESULTS

TYPES OF INTERVENTIONS (STRATEGIES)

Seven interventions were identified to improve physician documentation in ED settings. These included:

1) **Audit/feedback** (n = 2),
2) **Dictation** (n = 2),
3) **Education** (n = 1),
4) **Facilitation** (n = 1),
5) **Reminders** (n = 2),
6) **Structured paper templates** (n = 7),
7) **Multi-interventions** (n = 4) that incorporated two or more approaches to improving documentation.

RESULTS

AUDIT/FEEDBACK (N = 2)

Table 1 Characteristics and Outcomes of Included Studies *(Continued)*

Author Date Country	Study design[a]	Setting Participants	Intervention(s) Duration	Intervention & Control Group Details	Outcomes of Interest	Results	Downs & Black Quality Score
Hanson et al. UK (1994)	TSS	• 2 Teaching hospitals • House Officers	Audit/Feedback 19 weeks	Intervention group $n = 420$(Feedback 1); 429(Feedback 2); 244 (Final audit – weeks 20–24) Phase I: Feedback at 6 weeks in form of individual audit/feedback and group discussion. Phase II: Feedback at week 11. Further audit during weeks 11–16. Post-intervention final audit weeks 20–24. Control group $n = 401$ No feedback. Baseline audits. Usual paper charts.	• Proportion of head injury charts documenting GCS (Glascow Coma Scale). • Proportion of charts documenting diagnostic coding for all patients.	• Significant improvement in GCS documentation for both hospitals for patients with head injuries during all phases of the study – (80% Feedback 1, 88% Feedback 2, 90% Final Audit vs 40% at baseline). • Significant improvement in diagnostic coding for Hospital A from baseline ($p < .008$).	18/27
Heidt & Griffey USA (2012)	PPN	• Teaching hospital • Emergency Physicians	Audit/Feedback 12 weeks	Intervention group $n = 382$ Individualized email feedback from coders to physicians whose charts lacked sufficient documentation to warrant the inclusion of critical care billing codes Control group $n = 501$ No feedback.	Proportion of ICU (intensive care unit) admissions that documented critical care time.	Significant increase in the number of charts documenting critical care time (64% vs 18%, $p < .001$).	10/27

significantly improved the **richness (presence and completeness)** of physician documentation

RESULTS

DICTATION (N = 2)

Table 1 Characteristics and Outcomes of Included Studies

Author Date Country	Study design[a]	Setting Participants	Intervention(s) Duration	Intervention & Control Group Details	Outcomes of Interest	Results	Downs & Black Quality Score
Zick & Olsen USA (2001)	PPN	• Suburban level 1 trauma centre • Physicians	Dictation Not specified	Intervention group n = 47 Dragon Naturally Speaking voice recognition software. 30 min training for physician. Control group *n* = 47 Traditional voice transcription services	Difference in accuracy (per cent of words correct in document).	Decrease in accuracy of words documented (98.5% vs 99.7% - change of −1.2; CI (−1.5 to −0.8))	17/27

Zick and Olsen (2001) compared voice recognition software (Dragon Naturally Speaking®) to traditional dictation. While completion time **decreased** with the use of voice recognition software (Dragon Naturally Speaking) so too did the overall **accuracy** of physician documentation.

RESULTS

EDUCATION (N = 1)

Table 1 Characteristics and Outcomes of Included Studies *(Continued)*

Author Date Country	Study design[a]	Setting Participants	Intervention(s) Duration	Intervention & Control Group Details	Outcomes of Interest	Results	Downs & Black Quality Score
Otillo et al. USA (2014)	PPC	• Academic children's hospital • Pediatric residents	Education 112 weeks	Intervention group $n = 157$ One-hour lecture Control group $n = 145$ No education	Proportion of charts with documentation of 3 specific findings.	No change in right lower quadrant tenderness documentation (for example): 43.9% vs. 35.9%, 95% CI -19 to + 3	20/27

- A **lecture for one hour** on medical liability.
- Researchers found **no difference** in the **richness (presence and completeness)** of the charts documented post-lecture.

RESULTS

REMINDERS (N = 2)

Table 1 Characteristics and Outcomes of Included Studies

Author Date Country	Study design[a]	Setting Participants	Intervention(s) Duration	Intervention & Control Group Details	Outcomes of Interest	Results	Downs & Black Quality Score
Van Amstel et al. Canada (2004)	PPN	• Pediatric teaching hospital • Physicians	Reminder/ 4 weeks	Intervention group n = 153 HEADSS (Home, Education, Alcohol, Drugs, Smoking, Sex) stamp in patient charts to remind physicians to document these data items in charts. Control group *n* = 153 Usual paper charts	• Difference in proportion of charts containing information on psychosocial problems related to: Home, Education, Alcohol, Drugs, Smoking, Sex • Extent of global documentation • Proportion of charts with newly documented psychosocial problems in the above focus areas.	• Significant increase in proportion of charts documenting education (p = .029), alcohol (p = .045), smoking (p = .009) and interview alone (p = .0001). Non-significant changes for remaining topics. • Overall increase in psychosocial history documentation (9% vs > 1%, p = .003) • Overall increase in newly documented psychosocial problems (16% vs. 10%, p = .05).	20/27

Van Armstel et al. (2004) noted a **significant increase** in **overall documentation.**

RESULTS

TEMPLATES/FORMS (N = 7)

Table 1 Characteristics and Outcomes of Included Studies

Author Date Country	Study design[a]	Setting Participants	Intervention(s) Duration	Intervention & Control Group Details	Outcomes of Interest	Results	Downs & Black Quality Score
O'Connor et al. New Zealand (2001)	PPN	• Non-teaching rural hospital • Physicians	Template 2 weeks	Intervention group $n = 96$ Preformatted emergency department charts with 8 key content items Control group $n = 137$ Usual paper charts	• Median number of parameters filled in for each chart, out of 8. • Proportion of charts recording each of 8 parameters.	• Significant mean increase in the number of parameters documented in each chart (8 vs 7, $p = .005$). • Significant positive change in the recording of one parameter – Physician Name (52% vs 18%, $p < .0001$).	19/27

O'Connor et al. (2001) found that, while templates resulted in a **significant mean increase** in a **number of "key content items,"** the only consistent improvement was in the recording of physicians' names.

RESULTS

MULTIPLE INTERVENTIONS (N = 4)

Table 1 Characteristics and Outcomes of Included Studies

Author Date Country	Study design[a]	Setting Participants	Intervention(s) Duration	Intervention & Control Group Details	Outcomes of Interest	Results	Downs & Black Quality Score
Carter et al. USA (2009)	PPN	• Teaching hospital • Residents (R2, R3)	Multiple Intervention (audit/feedback, education, and reminders) 12 weeks	Intervention group $n = 24$ 1-h lecture to 18/24 residents Pocket card and lecture handouts to 24/24 residents and biweekly newsletters. Physicians received weekly case specific chart audit/feedback. Control group (n = 24) Usual electronic documentation program	• Chart level, based on complexity of decision making and detail of history and physical. • RVU (relative value units). • Billings/hr.	• Intervention resulted in more complex charting (27% vs 19%, $p < .01$) and fewer mid-level charts ($p < .01$). • RVUs increased with intervention (3.71 vs 3.17, $p < .01$). • Billings increased with intervention ($354.08 vs $303.79, $p < .01$).	19/27

Carter et al. (2009) found **improvements** in the completeness of physicians' chart documentation as a result of lectures, pocket reminders, and case-specific chart audit/feedback.

DISCUSSION

PRINCIPAL FINDINGS AND COMPARISON WITH PRIOR WORK

1. To our knowledge, this is **the first systematic review of the effectiveness of interventions to improve ED documentation.**

2. Although EMRs and other technologies may facilitate improvements in the quality of ED physician documentation, it is ultimately how these **technologies** are **designed**, **implemented**, and **used** that will determine their effectiveness.

DISCUSSION

OTHER APPROACHES AND TECHNOLOGY

1) **Successful approaches** will likely be those that can **adapt to different settings**, be seamlessly **integrated into existing workflows**, and garner widespread **acceptance from all relevant stakeholders.**

2) In the future, it may be possible to **embed artificial intelligence technologies, into EMR systems** to **alert physicians** to patient information or physician orders that are potentially inaccurate, imprecise, incomplete, or inappropriate.

3) Payne and colleagues described the development of **a mobile app to convert voice-recorded patient notes into EMR-compatible text.(2018)**

DISCUSSION

OTHER APPROACHES AND TECHNOLOGY

4) Researchers at Stanford University are designing "**digital scribe**" software that will incorporate artificial intelligence and voice recognition to enable physicians to create comprehensive, quality patient **data that can be uploaded to EMR systems in real time**.(2018)

5) If successful, these and similar initiatives may facilitate the creation of **quality** of electronic patient data, while simultaneously **reducing administrative and workflow burdens** associated with EMR systems.

DISCUSSION

OTHER APPROACHES AND TECHNOLOGY

6) Although ongoing technological advances may radically improve the quality of physician documentation, it is important to note that **transforming documentation practices** also **requires changing learned behavior, or habits**.

7) As habits are formed over sustained periods of time, **interventions designed to alter behavioral** norms should similarly be of long duration.

8) To effect lasting and meaningful improvements in ED documentation, it may be necessary to directly **involve all stakeholders**, including physicians and residents, in selecting, contextualizing, implementing, and conducting ongoing evaluations of multifaceted approaches to improving documentation quality in EDs.

DISCUSSION

CAVEATS AND LIMITATIONS

1) While we employed an extremely comprehensive search strategy, **inconsistencies in the indexing of studies** in electronic databases and our decision to **restrict our search to English or French language** publications, may have **impacted on our ability to identify all relevant studies.**

2) Further, **variability in study design and outcomes** assessed across studies **limited our ability** to quantitatively compare the outcomes from individual studies, and assess the overall effectiveness of many of these approaches.

DISCUSSION

CAVEATS AND LIMITATIONS

3) **The literature on ED physician documentation improvement is yet in its infancy,**

4) and that **further research is required** to determine how best to encourage documentation improvements in these settings.

CONCLUSIONS

FUTURE RESEARCH

1) This review suggest that mentioned interventions are potentially **promising approaches** to improving physician documentation.

2) **Future research** should focus on **exploring the impact** of implementing these interventions in EDs with and without EMRs, and investigating the potential of **emerging technologies** to advance ongoing improvements in physician documentation in ED settings.

Thanks for Your Attention

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