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Title	Nurses are research leaders in skin and wound care
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Publication Date	2020-08-24
Publication Information	Gethin, Georgina, Probst, Sebastian, Weller, Carolina, Kottner, Jan, & Beeckman, Dimitri. (2020). Nurses are research leaders in skin and wound care. <i>International Wound Journal</i> . doi:10.1111/iwj.13492
Publisher	Wiley
Link to publisher's version	<a href="https://doi.org/10.1111/iwj.13492">https://doi.org/10.1111/iwj.13492</a>
Item record	<a href="http://hdl.handle.net/10379/16198">http://hdl.handle.net/10379/16198</a>
DOI	<a href="http://dx.doi.org/10.1111/iwj.13492">http://dx.doi.org/10.1111/iwj.13492</a>

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## Introduction

The World Health Assembly declared 2020, the International Year of the Nurse and the Midwife. Recent editorials and commentaries within the nursing(1, 2) and medical literature support the leading role of nurses and midwives as frontline caregivers emphasizing the need to invest in the nursing workforce worldwide to meet global health needs and ‘as a movement to protect planetary health’.(3)

There is no doubt that all the aforementioned issues are very relevant, although the one aspect that is missing is that: today nurses are also leaders in research. From the very early beginnings of nursing science in the last century substantial scientific contributions in many different areas of healthcare have been made by nurses and nurse researchers. Nursing as a profession has developed considerably over time shifting from medical assistants with technical skills to independent members of a healthcare team with specific responsibility for providing professional nursing care (4). In the beginning of the 1960s, influenced by the developments of the nursing profession in Canada and the United States (USA), the nursing profession in Europe became a university-based discipline where hospitals moved most of their schools to universities (5-7). Through the move, the nursing programs developed and more nurses started to contribute to the body of science. However, the scientific community and clinicians do not always attach the same high profile to nursing research as they do to medical research or research in other healthcare disciplines (such as psychology, sociology etc.). Today, many nurses work as academics and researchers in universities, government agencies, and in the health care setting. Nurses are no longer consumers of research primarily produced by physicians or other health care providers but are research producers in partnership with other health care professionals.(8) One example is skin and wound care.

As early as 1860 Florence Nightingale noted the importance of pressure ulcer (PU) prevention(9) and today skin and wound care are core activities in nursing practice.(10-12) In recognition of 2020 being the International Year of the Nurse and Midwife, so chosen to commemorate the 200<sup>th</sup> anniversary of the birth of Florence Nightingale, we believed it opportune to reflect on the role of the nurse as a researcher with a focus on skin and wound care. The aim of this systematic review was therefore, to demonstrate the impact nurse researchers have contributed to the evidence base of skin and wound care research in multidisciplinary fields, not specific to nursing literature. Here, we are referring to the ‘academic impact’ that is the intellectual contribution to the academic field.(13)

## Methods

A systematic review of published articles in **five** international leading wound care journals with a scientometric index in Thomson Reuter's multidisciplinary database of bibliographic information (Journal of Tissue Viability, Wound Repair and Regeneration, International Wound Journal, **Advances in Skin and Wound Care** and Journal of Wound Care) in the years 1998, 2008, and 2018 was conducted. Journals were selected based on impact factor in the 1998, 2008, and 2018 listings of the Web of Science In Cites Journals Citation Reports. All articles were inductively assigned to the categories: meta-analyses, systematic reviews, critically appraised literature and evidence-based guidelines, randomised Controlled Trials (RCTs), non-RCTs, cohort-studies, case-series, individual case reports, background information, editorials/opinion papers and *in vitro* studies. Conference abstracts and **industry notes** were excluded. The number of papers of which nurses were the first, second or last author were calculated. The place in the authorship was selected as the indication for leadership as it implies responsibility and accountability for the published work. **Data extraction was completed by all authors working independently with random cross checking completed by SP and GG.**

## Results

Across the years 1998, 2008, and 2018, **988** articles were published. The overall proportion of nurse-led articles was **29%** (n = **286**). Detailed numbers per publication category and year are shown in Table 1. The total numbers of articles increased over time and so too did the nurse-led contributions. Nurse-led research was strongest in the design categories ‘cohort studies’ (**46%**, n=**44**), ‘systematic reviews’ (**46%**, n=**19**), and ‘critically appraised literature and evidence-based guidelines’ (**47%**, n=**55**). **Of interest, there is an upward trend overall in the publication of higher levels of evidence shifting to more systematic reviews, meta-analysis, RCTs and non-RCTs over the 20 years reviewed. Nurse led publications have also reflected this upward shift except for RCTs which have declined slightly over this time. Nurses do not account for many of the publications in the background information, expert opinion, editorial section and this may be accounted for the fact that the editors and thus editorials are predominately non-nursing.**

[Insert Table 1]

## Discussion

Results of this review indicate that, in addition to the crucial clinical roles, nurses also have a substantial impact on academia and development of the evidence base to guide clinical practice. Our results suggest that nurse led

contributions were particularly strong in research summarizing research (systematic reviews and guidance) to guide skin and wound care practice. Thus, nurse-led research seems to particularly support the work of nurses as frontline caregivers as described above. It is notably that over the twenty years reviewed there is an upward shift in the type of papers published in the selected journals with an increasing proportion of articles contributing to the higher levels of evidence used to inform practice.

Publication of articles is a primary short-term research related impact(14) but evidence suggests that there are downstream positive effects that optimize skin and wound care practice. For example, nurses have been to the fore in the development of clinical practice guidelines for the prevention and treatment of pressure ulcers and for the management of venous leg ulcers; including international multidisciplinary guidelines (15, 16) . This goes in some way to meet the recommendations set out in the Institute of Medicine (IMO) Report: *The Future of Nursing: Leading Change, Advancing Health* (17) where it states ‘*nursing research and practice must continue to identify and develop evidence-based improvements to care, and these improvements must be tested and adopted through policy changes across the health care system.*’

We are not arguing that nurses or nurse led research is superior to that by other health professionals but that, nurses are research leaders and significantly contribute to the evidence base to inform all practice. Key message no. 3 from the IMO Report is that nurses *should be full partners, with physicians and other health professionals...provide strong leadership... and be accountable for their own contributions to delivering high-quality care while working collaboratively with leaders from other health profession.* Our review has shown that this is the case as it applies to skin and wound care.

We recognize the limitations of our review. We could have chosen a wider range of wound care journals, a broader range of years and indeed a selection of different years may reveal a different result. However, we have off-set this by using an unbiased approach to the journals selected and reviewing articles over twenty years to show possible trends over time. We have only included articles where nurses had a leading role (first second or last author) and indeed had we included all articles where a nurse had any authorship; it is possible the number of included articles may have been higher, although our aim was to identify nursing leadership and not just contribution in research. As authorship does not inform readers what contributions qualified an individual to be an author, most journals publish information about the contributions of each author. This information has not been reviewed in this contribution. Furthermore, authorship is a primary basis that academic institutions apply to evaluate their academics for employment, promotion, and tenure. Different rules and regulations apply in different academic settings.

## **Conclusion**

Nurses are research leaders who make a significant contribution to inform wound care practice and evidence-based care. Nurse research leadership in the field of skin and wound care over the last twenty years has led >40% of the highest level of evidence publications in this time. As the largest healthcare workforce globally, the majority of nurses are in frontline clinical roles and this may impact on research remit. Nurses as research leaders ought also to be recognized for the contribution they make and the channel through which both health policy and clinical practice can be influenced and shaped.

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**Table 1: Publications by year, level of evidence and nurse led.**

	Meta-analysis n (%)	Systematic Reviews n (%)	Critically appraised literature, EBP guidelines n (%)	RCTs n (%)	Non-RCTs n (%)	Cohort studies n (%)	Case series n (%)	Individual case reports n (%)	Background information, expert opinion, editorial n (%)	In vitro studies n (%)	Total publications n (%)
Total 1998	1	4	6	8	7	13	10	8	94	46	197
Nurse led 1998	0 (0)	3 (75)	3 (50)	8 (100)	4 (57)	8 (62)	5 (50)	5 (63)	49 (52)	4 (9)	89 (45)
Total 2008	1	11	81	17	43	30	15	17	97	83	395
Nurse led 2008	0 (0)	4 (36)	38 (47)	4 (24)	14 (33)	11 (37)	8 (53)	2 (12)	16 (16)	0 (0)	97(25)
Total 2018	3	26	29	28	73	53	32	18	75	59	396
Nurse Led 2018	0 (0)	12 (46)	14 (48)	7 (25)	27 (37)	25 (47)	5 (16)	1 (6)	5 (7)	4 (7)	100 (25)
N (%) Nurse led 1998, 2008, 2018	0/5 (0)	19/41 (46)	55/116 (47%)	19/53 (36)	45/123 (37)	44/96 (46)	18/57 (32)	8/43 (19)	70/266 (26)	8/188 (4)	286/988 (29)