

The Standardization of Radiation Skin Care in British Columbia: A Collaborative Approach

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Purpose/Objectives: To develop evidence-based practice guidelines for and standardize the care of radiation skin reactions.

Data Sources: Peer-reviewed scientific journals and texts and a survey of the guidelines in use at leading cancer treatment facilities in Canada, the United States, the United Kingdom, and Australia.

Data Synthesis: A formal reference document with recommended guidelines was developed. Consensus was obtained from all relevant disciplines, and the guidelines were implemented successfully into practice.

Conclusions: The document introduced a major change in practice from the maintenance of a dry radiation treatment area to the promotion of skin cleanliness and hydration, as well as the adoption of the principles of moist wound healing. Annual review indicated that dissemination of (94%) and compliance with (78%) the guidelines were good.

Implications for Nursing: The process to develop, obtain consensus for, and implement evidence-based practice guidelines was an exemplary demonstration of teamwork and interdisciplinary collaboration.

Key Points . . .

- Information provided to patients regarding the management of radiation skin reactions is diverse and inconsistent, often based on personal opinion or experience rather than evidence-based practice.
- In addition to a scarcity of available research to demonstrate that particular products or care plans could prevent, delay, or improve radiation skin reactions, the grading scales and evaluation tools currently available are limited in number and sensitivity.
- The process to develop, gain consensus for, and successfully implement evidence-based practice guidelines is enhanced by an organized, interdisciplinary, and collaborative approach.

Patients undergoing radiation therapy receive information related to skin reactions and recommended management from radiation oncologists, RNs, and radiation therapists. Historically, at the British Columbia Cancer Agency (BCCA), the advice was experientially based and severely restricted patients' use of personal hygiene products and topical preparations. Healthcare professionals used a variety of approaches to manage reactions. In addition, debates ensued about the benefits of cornstarch for erythema and dry desquamation and the use of gentian violet for moist desquamation. Suggestions regarding the use of soaps and lotions or wearing jewelry and undergarments varied and depended on the personal beliefs and experiences of staff rather than scientific evidence. As a result, patients often received inconsistent and, at times, conflicting advice. The scarcity of available research (Wickline, 2004) demonstrating that particular products or care plans could prevent, delay, or improve radiation skin reactions only encouraged the status quo.

Recognition of the inconsistencies of practice among individuals, disciplines, and the four cancer centers of BCCA created an opportunity for improvement. In 1999, the BCCA professional practice leaders of nursing and radiation therapy proposed that interdisciplinary provincial guidelines be developed to standardize the care of radiation skin reactions across the province. This article reports the process that was

undertaken to (a) develop evidence-based practice guidelines, (b) obtain consensus from healthcare disciplines involved in patient care, and (c) implement the guidelines throughout four geographically distinct BCCA centers. The guideline development process followed by the BCCA (see Figure 1)

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1. Framed clinical problem

- a. Identified an inconsistency in practice
- b. Recognized a need for standardization

2. Formed team

- a. Representation from nursing, radiation therapy, and radiation oncology
- b. Representation from all four regional sites
- c. Developed objectives

3. Generated evidence-based guidelines (EBGs)

- a. Reviewed existing guidelines
- b. Performed a literature search
- c. Reviewed current practice
- d. Evaluated and summarized the evidence
- e. Generated preliminary EBGs

4. Obtained consensus

- a. Consensus obtained within the working group
- b. EBGs circulated to the radiation oncologists for feedback
- c. Feedback considered and incorporated in edits
- d. Final EBG document prepared

5. Obtained approval of EBGs

- a. Received approval from RN and radiation therapy professional practice committees
- b. Received approval from radiation oncology group

6. Implemented

- a. Developed an education plan
- b. Distributed the final document
- c. Performed group presentations
- d. Introduced change of practice to clinical areas
- e. Revised written patient educational tools to reflect guidelines

7. Scheduled review

- a. Set an annual review date
 - b. Surveyed practitioners to determine the dissemination of and compliance with EBGs
 - c. Additional education sessions scheduled to address outstanding inconsistencies in practice
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Figure 1. British Columbia Cancer Agency Radiation Therapy Skin Reaction Working Group Process to Develop Evidence-Based Guidelines

promoted interclinic and interdisciplinary collaboration and closely paralleled the practice-guideline development cycle described by Browman et al. (1995).

Forming the Team

A radiation skin reaction working group was established in 1999 at the request of the practice and academic leaders for nursing and radiation therapy. The working group was co-chaired by a radiation therapy educator and assessment module leader. Membership included radiation therapy educators and radiation therapy nurse managers from each of the four regional cancer centers, other interested radiation therapists and RNs, and a liaison representative from the provincial radiation oncology group.

The mandate of the working group was to develop, implement, and evaluate skin care guidelines for patients receiving radiation therapy at the BCCA and to ensure that future changes in professional practice would be based on published evidence. In addition, working group objectives were developed (see Figure 2). Because of the geographic distances between the regional cancer centers and the time

and financial cost of bringing the working group together, the entire project was completed via telephone, videoconferencing, and e-mail.

Generating Evidence-Based Guidelines

Existing Guidelines Review

A previously prepared BCCA draft document developed by a small working group of radiation therapists and RNs titled *Guidelines for Care of Skin Reactions* (McCullum, 1997) was reviewed. Although identified as a useful baseline document, the unpublished draft had not been disseminated to frontline healthcare professionals and, therefore, was not readily available for clinical use.

A reference document for the management of malignant wounds that included information on care objectives for radiation therapy-induced injury (Barton & Parslow, 1998) was in regular use by some BCCA healthcare professionals. The working group agreed that the final guidelines should be consistent with the document to reduce dissemination of conflicting information.

Literature Review

A MEDLINE® search was performed for the years 1966–2001. Another search reviewed the use of gentian violet. Additional sources were obtained from citations listed as references of primary and review articles and textbooks.

Diverse approaches to the management of radiation skin reactions were identified. Several trials addressed whether skin in the radiation treatment field should be kept dry or well hydrated. Campbell and Illingworth (1992) compared the effects of radiation skin reaction among no washing, washing with water only, or washing with soap and water in 99 patients with breast cancer receiving adjuvant postoperative radiation therapy following local excision or mastectomy. Itchiness was reported by 77% of patients, with a higher occurrence in the no-washing group. That subgroup also tended to have higher erythema and desquamation Radiation Therapy Oncology Group skin reaction scores. Washing did not adversely affect the severity of the skin reactions. The study showed improve-

The working group was established to

1. Support the British Columbia Cancer Agency (BCCA) mission and values related to patient care.
 2. Maintain consistent application of the BCCA Radiation Therapy Skin Care Guidelines across the agency.
 3. Collaborate in the development and review of patient education materials related to skin care.
 4. Participate in educational and orientation programs for BCCA staff and community healthcare providers.
 5. Support and participate in research projects using the scientific approach to assess the efficacy of new products or procedures; research initiatives are patient centered, process centered, quality driven, and interdisciplinary.
 6. Assess the effectiveness of skin care interventions.
 7. Ensure the changes in the management of radiation therapy skin reactions in the BCCA are based on evidence derived from research.
 8. Promote interdisciplinary collaboration.
 9. Positively influence the quality of skin care for patients receiving radiation therapy.
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Figure 2. Radiation Therapy Skin Reaction Working Group Objectives

ment in acute skin reaction when patients were permitted to wash.

Meegan and Haycocks (1997) evaluated 156 patients treated with tangential breast radiation therapy. Patients were asked to wash with warm water only or to continue with their normal hygiene routines, including the use of aloe vera and vitamin E cream. No significant difference in skin reactions occurred. Patients using their own skin care products reported more comfort and a greater sense of control. A number of other studies supported washing with soap and applying moisturizers (Campbell & Illingworth, 1992; Campbell & Lane, 1996; Holland, 1995; Lavery, 1995; Sitton, 1992, 1997).

Porock and Kristjanson (1999) studied the use of topical agents and dressings on skin reactions during adjuvant radiation therapy of 126 patients with breast cancer following breast-conserving surgery. The study concluded that the use of creams and ointments in the management of radiation skin reactions was appropriate. For severe radiation reactions, dressings promoted healing, particularly when skin loss had occurred. The researchers concluded that the choice of a topical product should be based on its soothing and comforting properties as well as patient preference. Similar results were reported by others (Liguori, Guillemin, Pesce, Mirimanoff, & Bernier, 1997; Maiche, Isokangas, & Grohn, 1994; Margolin et al., 1990).

The use of gentian violet was compared to moisture vapor-permeable dressings (Tegaderm™, 3M, St. Paul, MN) in the management of moist desquamation in head and neck cancers (Korabek, 1994). Healing improved significantly, and the incidence of burning, itching, pulling, and tenderness decreased in patients using Tegaderm. Gentian violet has been found to contribute to wound dryness (Hassey & Rose, 1982). Moisture vapor-permeable dressings (Bruner, Bucholtz, Iwamoto, & Strohl, 1998; Shell, Stanutz, & Grimm, 1986; Sitton, 1997), hydrogels (Dunne-Daly, 1995; Sitton, 1997), hydrocolloids (Margolin et al., 1990; Sitton, 1997), and silver sulfadiazine (Sitton, 1997) have been identified as promoting healing of moist desquamation and ulcerating wounds.

In summary, the literature review supported the use of hygiene, hydration, and moist wound healing. However, very little published evidence compared specific commonly used topical products.

Practice Review

Prior to developing the guidelines, the practice of radiation therapists and RNs within the radiation therapy program of BCCA was reviewed using discipline-specific surveys. In addition, a survey was sent to 18 Canadian cancer centers and five cancer centers in Australia and the United Kingdom.

British Columbia Cancer Agency review: RNs and radiation therapists agreed that radiation skin reaction patient teaching was a shared responsibility. Additionally, they reported that the information provided should be reinforced throughout the patient care process. Radiation therapists and RNs identified a definite need for more consistent standards of care.

Prior to the guideline development process, radiation therapists used a patient handout that promoted keeping the radiation field dry. Patients were permitted to bathe or shower but were advised not to use soap in the treatment area. The use of cornstarch or baby powder was recommended. Patients were instructed not to use any lotion unless indicated by a

physician. Use of deodorant was restricted when the underarm was included in the treatment field. If skin breakdown occurred, powders were discontinued. The treatment of choice for dry desquamation was hydrocortisone cream or silver sulfadiazine. The use of shampoo was moderated for patients receiving radiation to the head. A mild shampoo once weekly was permitted. Radiation therapists routinely provided written instructions for patients regarding skin care at treatment completion at only one of the four BCCA centers.

Nursing practice was more variable and often focused on a primary tumor site. Some RNs reinforced information on written patient handouts, whereas others promoted a moist skin environment and encouraged the use of aloe vera, vitamin E, and barrier creams. Gentian violet was used regularly for the management of moist desquamation in one of the four cancer centers and occasionally in two others. Information given and interventions used were patient specific and often directed by physicians. Community RNs in a variety of settings also cared for patients during and following treatment. Community RNs required greater access to skin care recommendations to ensure more consistent management. Overall, the BCCA practice review demonstrated the need for province-wide, updated, consistent, evidence-based guidelines and patient education materials intended for multidisciplinary use.

National and international review: Surveys were returned from 14 Canadian centers (78%) and one international facility (20%) for a total response rate of 65%. All centers that responded requested a report of the working group's findings and a copy of the final guidelines. In 13 of the 15 centers, written skin care information was provided to patients during and after treatment, and 14 centers provided patients with contact information on completion of treatment. The specific information provided included a wide range of approaches. No center restricted the use of water on irradiated skin. Patients were permitted to bathe or shower. Two-thirds ($n = 10$) of the centers advised patients not to use soap for bathing. The centers that permitted the use of soap made specific suggestions to use unscented, nondeodorant soaps. Only two centers recommended the use of lotions or creams for specific sites (i.e., breast) or if a physician prescribed the products. An aqueous cream and aloe vera were identified as the most preferred products. Thirteen centers used cornstarch for dry desquamation, whereas seven used topical steroids. For moist desquamation, 11 (73%) of the centers used silver sulfadiazine and 6 (40%) used gentian violet. A number of other dressings and products were identified (i.e., Opsite® [Smith and Nephew, Largo, FL], betamethasone, Polysporin® [Pfizer Inc., New York, NY]).

The internal and external surveys demonstrated that management strategies for radiation skin reactions were diverse. However, they also identified a need to develop consistent interdisciplinary guidelines to aid healthcare professionals in decision making.

Writing the Guidelines and Building Consensus

Using the BCCA draft document *Guidelines for Care of Skin Reactions* (McCullum, 1997) as a foundation, the working group developed a preliminary draft of evidence-based guidelines. The McCullum draft document was rewritten and

reformatted to include relevant information from the literature review. The RNs and radiation therapists performed the initial guideline development with minimal involvement of radiation oncologists. The radiation oncology representatives were included in all electronic communications, providing the opportunity for iterative input. The revised document was circulated to all working group members and edited to reflect their input related to format and clarity. Once consensus was reached within the working group, formal support from the radiation oncologists was sought. The document was circulated for input by the professional leadership of the provincial radiation therapy program. Comments and feedback from representatives of all disciplines were considered and incorporated into the editing process to form the final product. The final document was forwarded for review by professional practice committees in the radiation therapy, nursing, and physician groups and then adopted by the Provincial Radiation Therapy Program as the BCCA standard in January 2001. The working group recommended that the guidelines be reviewed annually and updated as indicated.

The final document, *Care of Radiation Skin Reactions*, was a cooperative, interdisciplinary effort by staff members from all four cancer centers of the BCCA (2000). The document included identification of goals, principles, general guidelines for care, care objectives, and suggested treatment procedures in a consistent framework for decision making in the care of radiation skin reactions.

Guideline Implementation and Compliance

The guidelines introduced a major change in practice. Maintenance of a dry radiation treatment area was dropped in favor of promoting skin cleanliness, hydration, and moist wound healing. Patient education materials were developed from the evidence-based recommendations. The working group revised written skin care instructions and created treatment completion information for all patients. Minor variations in patient education materials among the four centers acknowledged regional preferences.

Practice Changes

The key principles promoted in the practice guidelines were that

- Clean, well-hydrated skin promotes healing and reduces the potential for trauma (Campbell & Illingworth, 1992; Lavery, 1995; Meegan & Haycocks, 1997; Sitton, 1992).
- A moist environment promotes healing for damaged or open skin lesions (Bruner et al., 1998; Dunne-Daly, 1995; Margolin et al., 1990; Shell et al., 1986; Sitton, 1997).
- Individualized care is based on each patient's unique circumstances.

The approaches to erythema and dry desquamation received the most significant change. The guidelines recommended the use of mild soap and shampoo to cleanse skin and hair (Meegan & Haycocks, 1997; Sitton, 1992). The use of hydrophilic lotions and creams was introduced to keep skin well hydrated (Campbell & Illingworth, 1992; McGowan, 1989). The use of cornstarch and baby powder was not disallowed but no longer was promoted as a preferred choice of topical product. Steroid creams were identified as useful for inflamed, itchy skin (Perez & Brady, 1997), and saline compresses were

introduced to promote patient comfort through all stages of radiation skin reactions.

Another change in practice was based on the principles of moist wound healing. The objectives of cleanliness, pain relief, and prevention of infection guided the management of moist desquamation. At the transition from dry to moist desquamation, moisturizers and powders were stopped and moist dressings, including hydrocolloid or moisture vapor-permeable dressings, were recommended (Margolin et al., 1990; Sitton, 1997). Use of gentian violet was discontinued as a treatment for moist desquamation (Korabek, 1994).

Guideline Dissemination

An organized approach was used to disseminate the guidelines. With strong support from leadership, the working group revised patient education materials and developed an education plan to inform colleagues of practice changes. The published document was distributed and posted on the BCCA Web site. Radiation therapists and RNs from the working group presented education sessions in early 2001 to interdisciplinary audiences of radiation oncologists, RNs, and radiation therapists in each of the four regional cancer centers. Through a community oncology network, the guidelines were presented by group representatives to oncology RNs responsible for inpatients in community hospitals and to community health nurses. Working group members modeled and promoted the practice changes in their respective work areas as a way of influencing the practice of colleagues. Revised written patient education materials replaced previous materials. In one center, a basket of suitable topical products was assembled for use as a visual aid at patient education sessions prior to the start of radiation therapy.

Annual Review

The use of the guidelines was reviewed in 2002 and 2003. In 2002, an adaptation of the survey was circulated to radiation therapists, RNs, and radiation oncologists to determine whether the guidelines had been disseminated effectively. The 2002 survey asked healthcare professionals to identify when, where, and by whom patient teaching was provided and who was most responsible for the management of sequential stages of skin reaction severity. The survey asked whether staff were aware of the guidelines and whether they referred to them in practice. Information about compliance with specific recommendations in the guidelines was not investigated. The response rate for the 2002 survey was not available, but 123 completed surveys were received; 94% of respondents (n = 116) were aware of the guidelines and 78% reported that they referred to them during their clinical practice.

The 2003 review was more comprehensive. Questions from the 2002 survey were rewritten to address a lack of clarity identified by respondents. Questions were added to determine compliance with the guidelines or reasons for nonadherence. The response rate for the 2003 survey was 52% (135 of 260). The number of respondents who reported that they referred to the guidelines in their practice was 78%. Most skin care teaching occurred at patients' first treatment, at the weekly multidisciplinary assessment clinic, and on completion of treatment.

In 2003, respondents strongly recommended the use of cornstarch (77%) and moisturizer creams (87%), such as an aqueous cream. This indicates that patients continued to be offered a choice of two approaches to skin care. Respondents

also recommended other moisturizers (e.g., Lubriderm® [Pfizer Inc.], aloe vera) consistent with the practice guidelines.

For dry desquamation, respondents recommended an aqueous cream (80%) and hydrocortisone (40%). Cornstarch was no longer the treatment of choice, but 21% of respondents still recommended its use.

For moist desquamation, 83% of respondents indicated that patients were referred to a multidisciplinary assessment clinic for care. Management and dressing materials (saline compress, moisture vapor, and hydrocolloid dressings) were consistent with the guideline recommendations. In 2004, the use of cornstarch and baby powder was removed from the recommended practice guidelines to increase consistency in promoting hydration and to reduce the potential for misinterpretation of guidelines regarding the use of powders versus lotions for erythema.

Additional education sessions were held during 2003 and 2004 at each cancer center for interdisciplinary audiences of radiation therapists, RNs, and radiation oncologists to clarify the few continuing inconsistencies in practice. Emphasis was placed on the flexibility of the guidelines and consideration of patients' normal hygiene routines and preferences for topical products. The language in the practice guidelines encouraged practitioners to involve patients in discussions of management alternatives.

The group's mandate is to maintain the guidelines as much as possible by incorporating new evidence. A more recent literature search only demonstrated that a great deal of diversity still exists in the management of radiation skin reactions (Faithfull, Hilton, & Booth, 2002; Naylor & Mallet, 2001).

Discussion

The BCCA has established a standard, collaborative, interdisciplinary approach to the management of radiation skin reactions. Interdisciplinary practice change has been implemented successfully across a large group of healthcare professionals in three disciplines and four geographically distinct cancer treatment centers. Dissemination of and compliance with the recommendations in the guidelines have been strong. The guidelines have created a common language and a standardized approach to the management of radiation skin reactions, which has led to more consistent, evidence-based patient care and less personal preference dictating individual care and practice. The development and successful implementation of evidence-based practice guidelines have supported more consistent decision making in consultation with patients and enhanced clinical care in the management of radiation skin reactions.

Often, decisions regarding patient management are driven by values and resource limitations rather than by evidence. This process has been described as opinion-based decision making (Gray, 2001). Opinion-based decision making inevitably leads to wide variations in practice. Growing evidence of substantial unexplained and inappropriate variations in clinical practice is an indication that a standardized approach needs to be developed.

Advances in healthcare informatics have made clinical research evidence readily available to healthcare professionals and knowledge-seeking patients who want an informed voice in the decision-making process. Other forces driving evidence-based practice include an emphasis on quality and

patient outcomes and limitations in resources that promote attention to cost effectiveness.

Evidence-based practice guidelines are one way to promote best practice. Evidence-based care integrates individual clinical expertise with the best available clinical evidence. Clinical practice guidelines are systematically developed statements that support healthcare professionals and patients in decision making (Browman et al., 1995). The clinical guideline development process must incorporate the best evidence available, rather than simply rationalize current practice.

The guideline development process promoted interclinic and interdisciplinary collaboration. Although cumbersome and time consuming, a strategic process was followed that was successful. The evidence was summarized, evaluated, and critiqued based on criteria such as scientific merit, clinical relevance, practical usefulness, and feasibility. The evidence and consistency in findings were adequate to justify a major change in practice. Because the change in practice was not subtle but in direct opposition to previous practice, the working group acknowledged that resistance and barriers to change likely would be encountered. For successful implementation of guidelines and to change practice, consensus was needed from key stakeholders in the process.

Interdisciplinary participation in the guideline development process increased acceptance from the practitioners who ultimately would need to use the guidelines. Clinicians had an opportunity to provide input and feedback throughout the process, challenge interpretations of evidence collected, and contribute clinical experience to the final guideline recommendations. It was an iterative and important step in establishing guideline ownership by frontline practitioners.

Many obstacles may exist when implementing change (Berenholtz & Pronovost, 2003; Grol & Wensing, 2004), including lack of administrative sponsorship. Administrative staff originally proposed the project; therefore, an important criterion for success of the process already was established. To promote interdisciplinary collaboration, respected members of the radiation therapy and nursing disciplines shared the leadership of the working group. Project management skills of organization, effective communication, and education were practiced.

Change in practice affected radiation oncology, radiation therapy, and nursing. To understand the impact of introducing the change in practice, surveys to gauge knowledge, attitudes, and practices were conducted before and after dissemination. Clinicians' concerns regarding change often are related primarily to how they themselves will be affected, whereas the purpose of practice guidelines is to improve outcomes for patients. If the guidelines were to be well accepted by healthcare providers, an organized and comprehensive approach for implementation was required. Simple circulation of the document may not have been sufficient to change practice (Lomas, 1993). A hands-on teaching approach is more effective in changing practices than lecture attendance (Lake, 2000). Many working group members were frontline practitioners, which provided an opportunity to model and promote the evidence-based practice changes in the clinical setting. Written educational materials for patient teaching and a visual tool for patients reinforced learning and promoted the change in practice.

When any change is implemented, progress must be monitored and altered as needed. Change in practice was sustained by ensuring that recommended topical products and dressings

were available and by providing continuing education and reminders to staff. Two annual reviews after dissemination demonstrated high levels of awareness (> 90%) and moderately high levels of compliance (78%). An annual review date was established to ensure regular reexamination of emerging scientific evidence regarding radiation skin care and to consider other modulating factors such as financial resources.

Still, staff and patients had questions regarding the use of specific products. Many available products have little documented or researched information about their value. Adhering to the general principles of a clean, moist healing environment and providing increased comfort to patients are the critical factors on which healthcare providers can base their recommendations. Healthcare providers must be responsive to patients' values and preferences. Patients may not need to alter their normal hygiene routines. Patients with radiation-induced skin reactions often identify issues related to mobility, pain, social isolation, and sleep disturbance as affecting their quality of life (Mak, Molassiotis, Wan, Lee, & Chan, 2000). The evaluation of radiation skin reactions should include assessment of quality-of-life factors as well as the degree of redness, itching, and burning.

One deficit identified during the development of the practice guidelines was a sensitive grading scale or assessment tool for radiation skin reactions. The most commonly used tool was the Radiation Therapy Oncology Group scale (Cox, Stetz, & Pajak, 1995). However, the scale is very general and includes minimal qualitative or quantitative information regarding patients' experience of a skin reaction. As a result, the working group members participated in the design and validation of a skin toxicity assessment tool (Berthelet et al., 2004).

The group's continuing goals include research to collect more baseline data and to evaluate commonly used and future skin care products. Another identified area for future work is a survey of community healthcare professionals to monitor their awareness and use of the practice guidelines. Community oncology clinicians need to be incorporated into the future review of the practice guidelines.

Summary

A formal process to develop evidence-based practice guidelines for radiation skin reactions was successful and has resulted in (a) the implementation of a major change in practice, (b) the publication of a formal reference document with annual expiry date and reviews, (c) an exemplary demonstration of teamwork and interdisciplinary collaboration, and (d) the identification of limited evaluation tools for radiation skin reactions that led to group participation in further development of a skin toxicity assessment tool. The working group will continue to monitor the literature for new and improved skin care recommendations. Their expertise will allow them to actively participate in research and translate the knowledge into enhanced patient care.

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