WearSpray

A Responsible Framework for Personalized Skin Guidance Across Age, Skin Tone, Environment, Occupation, and Behavior

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The Problem: Static Guidance in a Dynamic World

The Core Failure

Most consumer skin guidance begins with a small set of fixed categories and remains largely unchanged after onboarding. Skin condition, however, is never static — it changes with age, hormones, climate, UV exposure, activity, occupation, medications, products, sleep, stress, and individual biology.

Traditional categories — dry, oily, combination, sensitive, normal — are fundamentally incomplete. A single person may simultaneously present an oily forehead, dry cheeks, irritation after shaving, and heightened winter sensitivity.

The Structural Gap

Incomplete Taxonomy

Five static skin types cannot capture the dynamic, multi-zone, multi-factor reality of any individual's skin.

Demographic Blunt Force

Broad racial and ethnic labels mask substantial within-group variation and risk encoding bias into automated guidance systems.

The Opportunity

A consent-based learning system that treats each person as an individual — not a demographic lookup table.

The Central Thesis: From Population Averages to Individual Evidence

Contextual skin intelligence moves through five layers, from broad population knowledge to personal, observed truth. Each layer narrows the inference from general to specific, with individual response data ultimately outweighing any population-level assumption.

1

Dermatological Knowledge

Broad safety principles applicable across populations — the foundational constraint layer.

2

Onboarding Profile

An initial personal baseline established through careful, consent-gated questioning.

3

Live Context

What is happening today: environment, activity, product, schedule, UV index.

4

Feedback Loop

What is actually true for this individual over time — the primary learning signal.

5

Safety & Referral Rules

Hard constraints that escalate to professional evaluation when warranted.

Age, ancestry, and identity are used only when voluntarily provided and only as limited contextual signals. Greater weight is always given to current concerns, response history, environment, occupation, and behavior.

Why Ethnicity and Skin Tone Cannot Be Diagnostic Variables

The Scientific Basis for Caution

Ethnicity is socially and genetically heterogeneous. Visible skin tone does not reveal physiology, history, health status, or individual needs. Research reviews report population-level differences in visible aging patterns and pigmentation responses — but evidence is not uniform, and broad racial categories hide substantial within-group variation. People with similar visible tones may have profoundly different sensitivities, exposures, histories, and concerns.

The AAD confirms sun protection is appropriate for all skin tones. Acne in darker skin tones is often accompanied by post-inflammatory hyperpigmentation — equal protection does not mean identical guidance, but guidance must derive from *reported concerns*, not assumed demographics.

Responsible Conclusion

Dermatology and product research need diverse representation and validation — not demographic inference engines.

What the System Asks Instead

- Burn/tan response to sun exposure
- Post-inflammatory pigmentation tendency
- Known product reactions and sensitivities
- Specific skin concerns the user wants to address

Direct behavioral questions replace appearance-based inference at every decision point.

The Seven-Domain Personal Skin Profile

Every guidance decision is grounded in a structured, consent-gated profile spanning seven domains. No single domain is treated as determinative — the system synthesizes across all available signals, with individual response data carrying the greatest weight.

Domain	Examples	Appropriate AI Use
Personal Baseline	Age range, voluntary identity, pregnancy/menopause status, known sensitivities	Adjust questions, educational content, caution rules
Skin Characteristics	Self-described tone, burn/tan tendency, dryness, oiliness, sensitivity, acne, pigmentation after irritation	Build initial hypothesis the user can correct
Health Context	Allergies, diagnosed conditions, medications, recent procedures	Activate exclusions, warnings, referral prompts
Environment	UV index, temperature, humidity, wind, altitude, air quality, season	Time-relevant education and protective reminders
Activity & Occupation	Swimming, running, construction, driving, nursing, kitchen work, aviation	Estimate exposure, friction, washing, sweating, missed routine opportunities
Product Context	Product identity, label directions, active ingredients, application time, body area	Support label-aligned use; prevent incompatible suggestions
Individual Response	Comfort, irritation, breakouts, dryness, adherence, perceived benefit	Learn the individual instead of relying on group averages

Age as Changing Context, Not Diagnosis

Age determines *which questions are relevant* — not what the answers will be. The system asks, observes, learns, and revises. It does not assume physiological state from a date of birth.

Adolescence

Sebum changes, acne, sports, sweating, social sensitivity. Requires heightened privacy controls, parental gates, and conservative guidance defaults.

Twenties & Thirties

Persistent adult acne, pregnancy-related changes, occupational exposure, shaving, outdoor activity, and early prevention habit formation.

Forties & Fifties

Cumulative UV exposure, texture and pigmentation changes, shifting hormone levels, dryness, product tolerance. System asks about lived symptoms — not assumed transitions.

Sixties & Beyond

Thinner or drier-feeling skin, easier irritation, medication effects, medical conditions, reduced mobility, application difficulty. AAD notes skin in this decade can lose water more easily.

Correct AI behavior: age gates the question set — it does not predetermine the answers. Ask, observe, learn, revise.

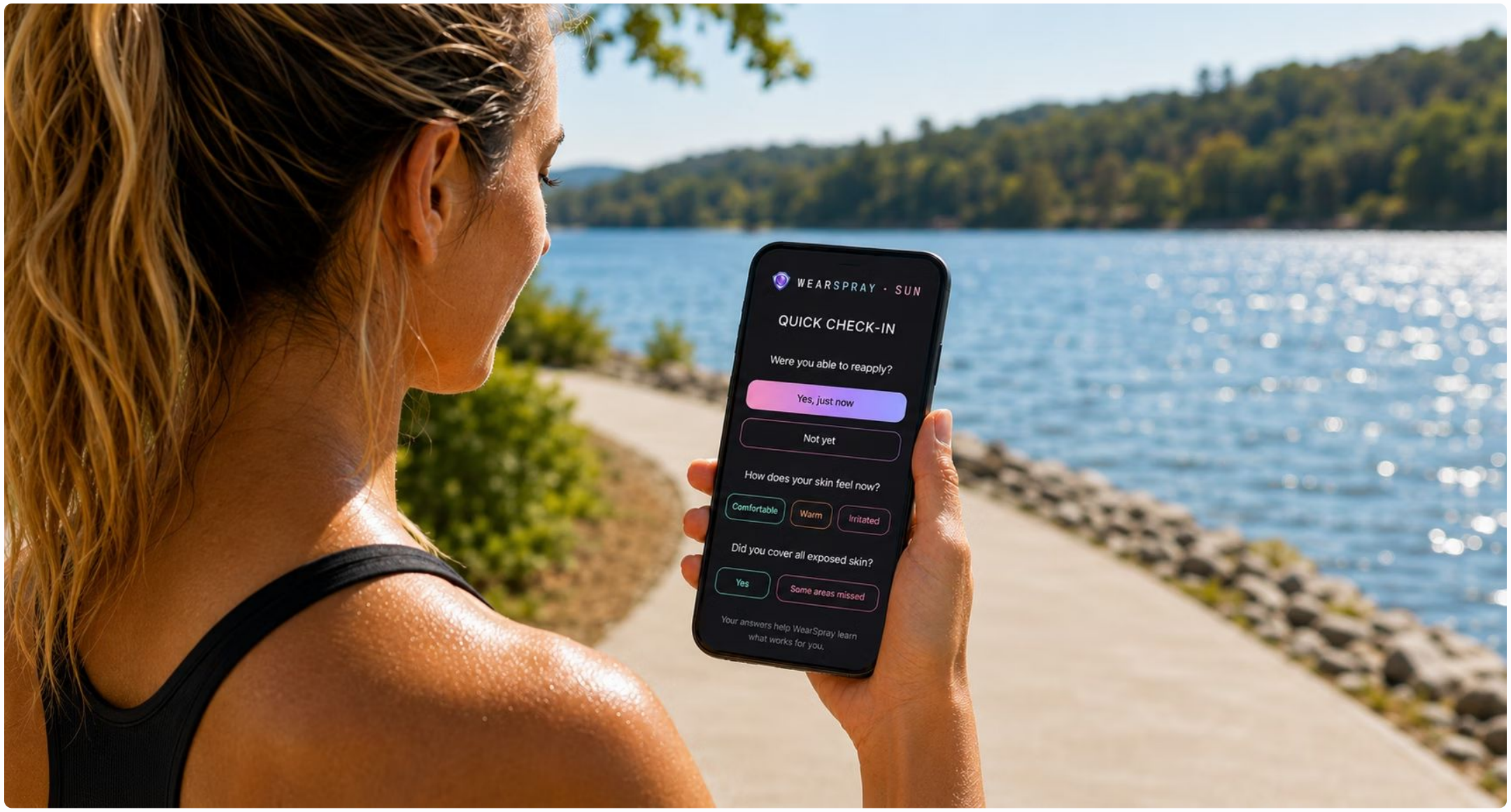
Occupation: The Most Actionable Skin Variable

The WHO and ILO estimate **1.6 billion working-age people** were occupationally exposed to solar UV radiation in 2019 — making work context a legitimate public health variable, not a lifestyle detail. Occupation is the single most actionable input the system can use to time guidance precisely.

Context	Relevant Factors	Possible Support
Outdoor Construction / Landscaping	Solar UV, heat, sweat, dust, limited product access	UV-aware reminders, label-aligned reapplication, protective clothing prompts
Lifeguard / Surfer / Swim Instructor	Water, reflection, sweat, towel drying, prolonged exposure	Earlier action prompts after swimming, sweating, or towel drying
Driver / Pilot	Repeated window exposure, dry cabin air, long seated periods	Routine planning based on schedule and exposure context
Nurse / Clinician	Frequent hand washing, sanitizer, glove occlusion, shift disruption	Barrier care reminders during feasible breaks; irritation tracking
Food Service / Industrial	Heat, washing, occlusion, irritants, protective equipment	Contextual comfort checks; employer policy-aware prompts
Athlete	Sweat, friction, water exposure, changing locations and schedules	Activity-triggered reminders and post-activity feedback

Guidance that moves with the individual — not against the clock.

Occupational exposure is not a peripheral variable. It is the lens through which timing, intensity, and content of guidance become meaningful.



The Onboarding Experience: A Conversation, Not an Intake Form

01

Define the Goal

Sun protection, dryness, consistent moisturizing, acne-friendly routines, dark mark prevention, comfort during exercise, or simply remembering to reapply.

02

Establish Safety Boundaries

System explains it provides education and routine support, not diagnosis. Asks about conditions, allergies, pregnancy, and medications only with explicit consent.

03

Learn Skin Behavior

Dryness, oiliness, sensitivity, burn/tan response, pigmentation after inflammation, affected body areas, and seasonal variation.

04

Learn the Day

Location, work and activities, time outdoors, clothing coverage, swimming, sweating, hand washing, and product accessibility.

05

Learn the Actual Product

User scans or selects their product. Guidance follows the product label. The system does not assume every reservoir contains sunscreen.

06

Set Prompting Style

Quiet, balanced, or proactive. Permitted notification times. Situations where prompts would be distracting or unsafe are explicitly excluded.

07

Confirm the First Plan

AI summarizes its beliefs, labels uncertainty, and invites correction before proceeding — transparency from the first interaction.

How the AI Learns the Individual

Explicit Feedback

One lightweight post-action question: Did you apply? Did timing feel useful? How did skin feel later? Did the product sting, pill, feel greasy, leave a cast, or cause irritation? Feedback is low-friction and specific — it does not ask users to complete surveys.

Contextual Feedback

With permission, the system learns behavioral patterns — 7 a.m. runs, Saturday swims, outdoor Tuesdays, meeting-hour prompt ignores — and improves timing accordingly. No medical inference is claimed from behavioral observation alone.

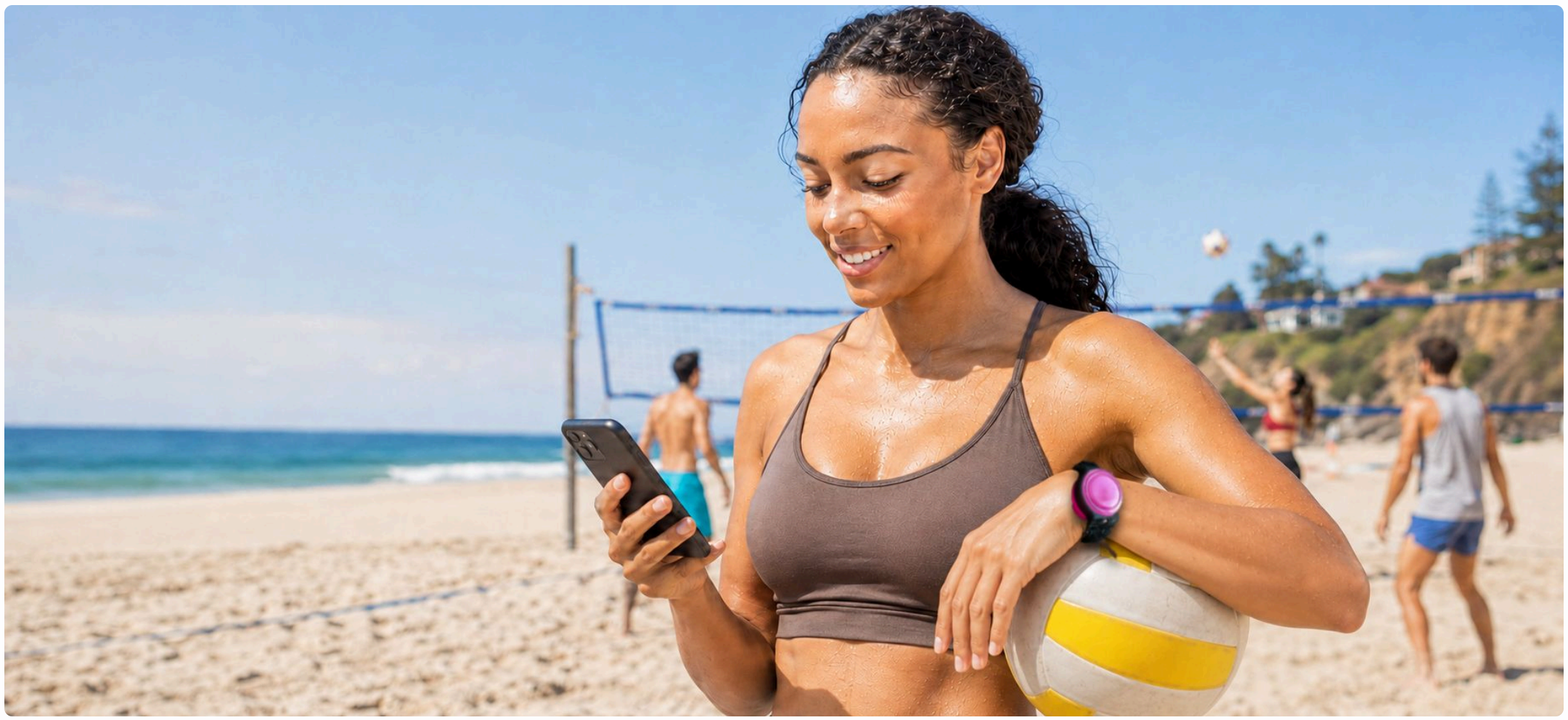
Confidence Model by Statement Type

Statement	Source	Confidence
User reports sensitive skin	Direct user report	High for preference — not clinical diagnosis
Product may be wearing off after swimming	Product label + activity event	Moderate to high
User often experiences dryness after long flights	Repeated user feedback	Increasing over time
User has eczema	Clinician diagnosis reported by user	High as reported history — not independently verified
Facial redness indicates rosacea	Image inference alone	PROHIBITED CONCLUSION

The Closed Loop: Sense → Understand → Prompt → Act → Learn

Sense	Understand	Prompt
UV index, temperature, humidity, activity event, product reservoir status, optional wearable signals: skin temperature, perspiration, hydration trend.	Interpret context against the user's profile, product label, and learned behavioral patterns to determine relevance.	Deliver a timely, non-intrusive reminder at the moment of relevance — not on a fixed schedule, not during a flagged unsafe window.
Act		**Learn**
User dispenses product from the wearable reservoir at the point of need — hardware and intelligence aligned.		Capture explicit and implicit feedback; update confidence; improve future timing and content with each interaction.

This extends WearSpray's hardware closed loop from delivery into continuing personal intelligence — a durable software relationship layered on top of the physical product.



Illustrative Journey: Maya, 29 — Outdoor Volleyball Coach

User Context

Identifies as Black. Blemishes and irritation frequently leave dark marks. Prolonged outdoor exposure and frequent sweating. Dislikes sunscreen with visible cast.

What the AI Does NOT Do

The system does not infer needs from race or ethnicity. Maya's identity is noted as voluntary context — it does not drive any guidance rule.

What the AI Uses Instead

- Reported pigmentation response to inflammation
- Occupation and session schedule
- Stated product preference (no visible cast)
- Local UV index and activity-triggered sweating events
- Product label for reapplication timing

Guidance in Practice

The system prompts before the first lesson and after heavy sweating. It asks whether the product remained comfortable and cosmetically acceptable. The AAD specifically discusses tinted sunscreen containing iron oxide for people managing dark spots — concern-based personalization, never ethnic stereotyping.

Illustrative Journey: Danielle, 47 — Airline Pilot

User Context

Reports dry skin after flights and inconsistent routines across time zones. No known diagnosed skin condition. Highly variable schedule with duty-period constraints on prompting.

What the AI Learns

- Flight days and cabin-related dryness feedback
- Destination climate and time zone patterns
- Preferred moisturizer and when application is feasible

Guidance in Practice

Creates a minimal travel routine. Avoids excessive prompts during duty periods. Learns that post-landing is the most actionable window for skin care reminders.

The Hard Boundary

If Danielle reports persistent cracking, bleeding, or a changing lesion — the system stops routine optimization entirely and directs her toward professional evaluation.

Key principle: the system knows when to stop being a wellness tool and become a referral mechanism. This transition is hard-coded, not discretionary.

Illustrative Journeys: Elena, 43 & Robert, 68

Elena, 55 — Runner Entering Menopause

Reports new dryness, sensitivity, and occasional adult acne. Active outdoor runner with an established but now-disrupted routine.

The AI recognizes hormonal transition as potentially relevant context but does not attribute every change to menopause. It asks what changed, reviews product history, and reduces unnecessary routine complexity. Supports sun protection and moisturization; recommends professional advice if symptoms are persistent or concerning.

AAD notes adult acne can continue through later decades and should not be dismissed because of age.

Robert, 68 — Retired Sailor

Reports decades of outdoor exposure, several current medications, and a spot that has changed in appearance.

This is not a personalization opportunity — it is a referral event.

- The AI advises timely assessment by a qualified clinician
- The system does not attempt image diagnosis
- No cosmetic treatment guidance is offered
- No automated reassurance is provided

Robert's case illustrates the hard boundary between consumer wellness AI and medical care — a boundary that must be visible, enforced, and communicated to every user from the first interaction.

What the System May and May Not Claim to Recognize

The System MAY Recognize

- A reported routine, a recorded application, or an environmental condition
- A product label instruction or a recurring user-reported response
- That a combination of factors makes a reminder contextually relevant
- An activity pattern learned from behavioral history with permission

The System MUST NOT Claim to Recognize

- Disease or clinical condition from behavioral or image data alone
- Ethnicity or health status from appearance
- Hydration level without a validated sensor
- True sun protection level from UV index alone
- That an application was adequate merely because the dispenser was activated

This wording distinction should be visible on the WearSpray website — transforming a potentially inflated AI claim into a credible, defensible description of contextual assistance.

Safety, Fairness, and Privacy Doctrine

The framework is built on ten non-negotiable operating principles. These are not aspirational guidelines — they are design constraints that govern every inference, prompt, and data collection decision in the system.

Individual Evidence Outranks Demographics

The system learns the person, not the category. Individual response data always carries more weight than population averages.

Race and Ethnicity Are Never Diagnostic

These variables are not permitted as inference inputs. Guidance derives from reported behavior and observed response, not identity.

Skin Tone Does Not Remove SPF Need

Sun protection guidance is universal. Skin tone determines presentation context, not whether protection is warranted.

Product Guidance Follows the Label

No extrapolation beyond known contraindications and label directions. The label is the ceiling, not the floor.

Transparency and User Control

The system reveals why a prompt appeared. Users can correct, delete, pause, or limit what the system learns at any time.

Escalation Over Reassurance

Concerning symptoms trigger professional referral. The system provides no automated comfort when clinical evaluation is warranted.

⚠ Biometric consent is required separately and explicitly. Images and sensor data are never collected without a distinct, informed user action. Equity testing across diverse tones, ages, sexes, climates, languages, and access conditions is a launch prerequisite — not a post-launch consideration.

Research and Validation Agenda

No guidance framework goes to market without evidence. The validation agenda defines five parallel workstreams that must be completed — or substantially advanced — before commercial deployment.

1 Dermatology Advisory Group

Recruit external experts in skin of color, contact dermatitis, aging, occupational dermatology, acne, and photoprotection. Establish evidence grading process for the knowledge base.

2 Evidence Map

Reviewed knowledge base covering age-related changes, pigmentation, barrier function, UV exposure, climate, occupation, hormonal transitions, medications, product reactions, and behavioral adherence. Every rule graded by evidence strength and applicable population.

3 Inclusive User Research

Participants recruited across tone, age, sex, gender, geography, occupation, disability, language, and socioeconomic context. No single participant treated as representative of a demographic group.

4 Prompting Study

Test whether context-aware reminders improve appropriate use without creating alert fatigue, anxiety, excess product consumption, or false confidence in protection adequacy.

5 Clinical and Regulatory Review

Define intended use before launch. Separate wellness and medical device functions. Engage counsel in priority markets for privacy, consumer protection, AI governance, and product-specific requirements.

Public Positioning

The Defensible Statement

> WearSpray is exploring a contextual skin intelligence system that learns from the individual over time.

This positioning is precise, defensible, and differentiating — it invites trust rather than inflating capability claims.

What It Is

- Combines user-provided skin goals, chosen products, routines, and local conditions
- Incorporates activity context and optional wearable sensor signals
- Offers timely education and application reminders
- Designed to support awareness, access, and consistent action

What It Is Not

- Not designed to diagnose skin disease
- Not a replacement for a dermatologist or clinician
- Not an engagement-optimization tool that prioritizes usage metrics over user wellbeing

The Bridge: Hardware + Intelligence + Learning

The Wearable

Makes a chosen product available at the moment of need. On-body, on-demand dispensing removes the friction between intent and action.

The Intelligence Layer

Makes that moment more relevant. Context-aware, personalized, and timely — the right prompt at the right time, derived from environment, behavior, and product state.

The Learning Layer

Makes future guidance more personal. Improving with every interaction, not locked to onboarding assumptions. The system earns trust through demonstrated accuracy over time.

Together: a closed loop of **sense → understand → prompt → act → learn** that extends WearSpray's hardware value proposition into a durable, defensible software relationship.

Next Steps for Investors

Six concrete actions that advance Contextual Skin Intelligence from concept paper to validated, market-ready framework. Each step is sequenced to de-risk the most significant technical, clinical, regulatory, and reputational dependencies before commercial commitments are made.

1

Convene Dermatology Advisory Group

Recruit external experts across specialties — skin of color, contact dermatitis, aging, occupational dermatology, acne, and photoprotection. Establish evidence grading process for the knowledge base.

2

Commission Inclusive User Research

Recruit participants across tone, age, occupation, geography, and language. Avoid demographic proxy assumptions. No participant treated as representative of a group.

3

Define Regulatory Pathway

Separate wellness and medical device functions before launch. Engage regulatory counsel in priority markets covering privacy, consumer protection, AI governance, and product law.

4

Design and Run Prompting Study

Measure improvement in appropriate use, alert fatigue incidence, anxiety outcomes, and false confidence indicators with a diverse participant cohort.

5

Publish the Positioning Statement

Make the capability boundary visible on the WearSpray website to build credible, differentiated trust with consumers, clinicians, and regulators.

6

Version 0.2 of This Paper

Incorporate advisory feedback, evidence map draft, and user research findings into a revised concept paper ready for clinical and regulatory review.

Appendix: Concept Paper Reference

Document Details

Title: Contextual Skin Intelligence

Version: 0.1

Date: August 2026

Author: WearSpray

Status: Concept Paper — Pre-Validation

Framework Classification

Consumer wellness and education tool. Not a medical device. Not a diagnostic instrument. Not a replacement for professional dermatological evaluation.

Key Regulatory and Advisory Sources Referenced

American Academy of Dermatology (AAD)

Sun protection guidance across skin tones; adult acne; age-related skin changes; tinted sunscreen with iron oxide for post-inflammatory hyperpigmentation management.

WHO / ILO Joint Estimates (2019)

1.6 billion working-age people estimated to face occupational solar UV exposure — foundational basis for occupation as a public health skin variable.

Responsible AI Doctrine

Individual evidence over demographic averages. Transparent inference. Escalation over reassurance. No engagement optimization at the expense of user autonomy or wellbeing.

All clinical and regulatory claims in this framework are subject to review by the Dermatology Advisory Group and qualified legal counsel prior to any commercial deployment or public communication.