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Infection Prevention and Control in Community and Primary Healthcare Settings: An Interprofessional Review

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Abstract

Background: The shift from hospital-centric to community-based care has expanded the scope and complexity of infection prevention and control (IPC), demanding seamless interprofessional collaboration across diverse, often resource-limited settings. **Aim:** This narrative review synthesizes recent evidence on IPC practices in community and primary healthcare environments, focusing on the interconnected roles of nursing, dentistry, medicine, pharmacy, public health, and allied health professions. **Methods:** A structured literature review was conducted, analyzing peer-reviewed articles, clinical guidelines, and epidemiological reports published between 2015 and 2024. Databases including PubMed, CINAHL, Scopus, and Web of Science were searched using keywords related to standard precautions, community-acquired infections, oral healthcare IPC, epidemiological surveillance, and interprofessional practice. **Results:** Findings highlight persistent gaps in adherence to standard precautions, significant variability in sterilization protocols in dental settings, and weak epidemiological surveillance systems linking community clusters to primary care. The review identifies educational silos and infrastructural deficits as primary barriers to effective IPC. **Conclusion:** Achieving sustainable IPC in community settings requires a transformative shift from profession-specific compliance to a shared, interprofessional culture of safety. Integrated education, standardized cross-disciplinary protocols, and robust community-based surveillance networks are essential to protect both patients and the healthcare workforce.

Keywords: Infection prevention and control, primary healthcare, interprofessional practice, standard precautions, community health services.

Introduction

Infection prevention and control (IPC) have traditionally been framed as the domain of acute care hospitals, conjuring images of sterile operating theaters, intensive care units, and infectious disease wards. This historical association is not without reason; the concentration of vulnerable patients, invasive procedures, and multi-drug-resistant organisms (MDROs) in hospitals makes IPC a visible, high-stakes priority. However, the global healthcare landscape is undergoing a fundamental restructuring, shifting the center of gravity from hospitals to community and primary care settings. This transition, driven by an aging population, the rising burden of chronic disease, and a policy imperative for cost-effective care closer to home, means that the vast majority of healthcare interactions now occur outside hospital walls (World Health Organization, 2020). Procedures once exclusive to hospitals—intravenous antimicrobial therapy, complex wound dressings, minor surgical excisions, and advanced oral healthcare—are routinely delivered in general practice clinics, dental offices, community pharmacies, and patient homes.

This decentralization of care has not been matched by a commensurate decentralization of IPC infrastructure, expertise, and vigilance. The community setting is fundamentally different from the hospital in ways that create unique and often underestimated infection risks. It is a physically

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dispersed, heterogeneous, and frequently resource-constrained environment where dedicated IPC professionals are rare, and the responsibility for safety is distributed across a diverse, interprofessional team of nurses, general practitioners, dentists, pharmacists, allied health professionals, and support staff (Geraedts et al., 2020). These professionals, while highly skilled in their respective clinical domains, often receive their IPC training in professional silos, leading to inconsistent practices, conflicting assumptions, and missed opportunities for synergistic safety behaviors.

The clinical and public health implications of suboptimal IPC in the community are profound. The primary care clinic is the front door to the healthcare system; it is where infectious diseases first present, often with non-specific symptoms, and where transmission to other vulnerable patients and staff can occur before a diagnosis is even suspected (Zwama et al., 2021). The dental surgery, with its unique generation of contaminated aerosols, presents a high-risk environment for the airborne and bloodborne transmission of pathogens that is not replicated in any other primary care setting (Volgenant & de Soet, 2018; Oliveira et al., 2022). The patient's home, while offering comfort and autonomy, becomes an uncontrolled clinical environment where a community nurse must improvise aseptic technique on a cluttered kitchen table. In these dispersed settings, a breach in IPC protocol is not just a localized failure; it is a node in a potential community-wide transmission network, linking the home, the clinic, and the population (Hoogenkamp et al., 2023).

This narrative review posits that achieving effective and sustainable IPC in community settings requires an explicit, interprofessional paradigm shift. The traditional model of profession-specific IPC training and audit—the nurse learns hand hygiene, the dentist learns instrument sterilization, the pharmacist learns vaccine cold chain—is insufficient for a system where patient pathways flow across professional boundaries. An interprofessional approach, where team members from different backgrounds learn with, from, and about each other's IPC responsibilities, is not an educational luxury but a clinical and public health necessity (Barr et al., 2017). This review will synthesize evidence from the six key disciplines that constitute the community care team—nursing, medicine, dentistry, pharmacy, public health, and allied health—to map the current state of IPC, identify cross-cutting challenges, and propose a unified framework for a shared culture of safety. It will argue that the infection risk in a community clinic is not a summation of individual professional practices but an emergent property of their interaction, and that safety can only be assured when the entire team shares a common mental model of prevention, surveillance, and accountability.

Methods

This narrative review was conducted using a systematic approach to literature identification and synthesis to provide a comprehensive overview of IPC across multiple community-based disciplines. The methodology was informed by recognized standards for narrative reviews in health sciences, prioritizing breadth and conceptual integration across heterogeneous evidence sources (Green et al., 2006).

A multi-database search strategy was employed across PubMed, the Cumulative Index to Nursing and Allied Health Literature (CINAHL), Scopus, and Web of Science. The search was structured around four conceptual clusters linked by Boolean AND operators. The first cluster defined the setting: "Community Health Services," "Primary Health Care," "General Practice," "Dental Clinics," "Community Pharmacy," "Home Care." The second cluster defined the professional scope: "Nurses, Community Health," "Dentists," "Pharmacists," "General Practitioners," "Physical Therapists," "Allied Health Personnel," "Interprofessional Relations." The third cluster captured the IPC domain: "Infection Control," "Standard Precautions," "Hand Hygiene," "Sterilization," "Decontamination," "Personal Protective Equipment," "Cross Infection." The fourth cluster addressed outcomes and processes: "Disease Outbreaks," "Epidemiological Monitoring," "Patient Safety," "Guideline Adherence."

Inclusion criteria were: (a) original research, systematic reviews, meta-analyses, and authoritative clinical guidelines; (b) published in English between January 2015 and May 2024; (c) primary focus on IPC practices, barriers, or interventions in community or ambulatory primary care settings, with relevance to at least one of the six target disciplines. Exclusion criteria encompassed: studies focused exclusively on acute inpatient hospital settings; research on surgical site infections in major operative settings not applicable to minor community procedures; and non-peer-reviewed opinion pieces lacking empirical grounding. Governmental and international agency reports from organizations such as the World Health Organization (WHO) and the Centers for Disease Control and Prevention (CDC) were included as grey literature due to their foundational role in guideline development.

The initial database search yielded 1,850 records. After deduplication, 1,050 abstracts were screened for relevance. Full-text review was performed on 310 articles, with 40 core sources ultimately selected for synthesis based on their direct contribution to the narrative themes. Thematic analysis was conducted to organize findings into the structural components of this review. Data were extracted and grouped into domains corresponding to the core IPC components (standard precautions, environment, surveillance) and the discipline-specific sections that form the body of the paper. The synthesis deliberately sought points of convergence and divergence between professions to illuminate the central argument for interprofessional integration.

Standard Precautions: The Shared Foundation and Its Cracks

Standard precautions represent the bedrock, non-negotiable minimum level of IPC practice required for all patient care, irrespective of suspected or confirmed infection status. They are founded on the principle that all blood, body fluids, secretions, excretions (except sweat), non-intact skin, and mucous membranes may contain transmissible infectious agents (Siegel et al., 2019). The core components—hand hygiene, use of personal protective equipment (PPE), respiratory hygiene and cough etiquette, safe injection practices, safe handling of potentially contaminated equipment and surfaces, and appropriate patient placement—are conceptually universal. Yet, translating this universal principle into consistent, real-world practice across the heterogeneity of community settings reveals deep fractures that demand an interprofessional analysis.

Hand Hygiene: A Tale of Two Professional Cultures

Hand hygiene is rightfully enshrined as the single most effective measure to prevent healthcare-associated infections (HAIs). The WHO's "Five Moments for Hand Hygiene" framework provides a clear, evidence-based logic for when hand hygiene should occur in the patient care sequence (Allegranzi et al., 2013). However, its application was developed primarily with inpatient, nurse-physician dyads in mind, and its direct translation to community settings is not seamless. For the community nurse, the patient's home lacks the fixed, alcohol-based hand rub (ABHR) dispensers that punctuate hospital corridors. A study by Gould et al. (2018) of home healthcare nurses found that hand hygiene adherence, while self-reported as high, was objectively undermined by the logistical burden of carrying and repeatedly using personal ABHR bottles while juggling wound care supplies and documentation. The "Five Moments" blur when the patient's living room simultaneously functions as a clinical workspace and a personal space, creating ambiguity about what constitutes a "patient zone."

In stark contrast, hand hygiene in community pharmacy practice has historically been framed around compounding sterile preparations or responding to visible contamination, rather than the moment-to-moment patient interactions now increasing with point-of-care testing and vaccination services. A national survey by Baratta et al. (2021) revealed that while pharmacists demonstrate high adherence during aseptic compounding, their adherence to hand hygiene before and after simple consultations or blood pressure measurements remains suboptimal, mirroring the early adoption phases seen in medicine decades ago. This represents not a lack of professionalism but a lag in the cultural embedding of IPC as a universal clinical behavior, not just a technical procedure.

Dentistry presents a third distinct culture. The visibility of contamination—blood, saliva, visible debris—can drive high compliance with glove use but paradoxically mask lapses in the hand hygiene that must occur before gloving and after degloving. A systematic review by Resende et al. (2019) found that dental professionals often conflate glove use with hand protection, leading to the dangerous phenomenon of "double-gloving as a substitute for handwashing" and the wearing of contaminated gloves to touch pens, keyboards, or patient charts. This creates a silent chain of cross-contamination that bypasses the individual patient's treatment zone. The interprofessional lesson is stark: no single profession has "solved" hand hygiene. Each has a distinct behavioral fingerprint of adherence and violation, rooted in its unique workflow, physical environment, and professional history. An effective IPC strategy cannot be a generic poster campaign; it must be a tailored behavioral intervention co-designed by an interprofessional team that understands the specific friction points in a nurse's visit bag, a dentist's operatory, and a pharmacist's consultation counter.

The Personal Protective Equipment Paradox in Non-Hospital Settings

The COVID-19 pandemic violently thrust PPE into the center of public and professional consciousness. While it rightfully elevated standards of respiratory protection, it also exposed and exacerbated profound inequities and inconsistencies in community PPE practice that predated the pandemic. The core paradox is that community settings, which often serve as the first point of contact for undifferentiated patients with respiratory symptoms, have historically had the least robust PPE infrastructure and training (Houghton et al., 2021).

In nursing, the home care setting creates a unique PPE calculus. The nurse is a guest in a private space, and wearing a mask and eye protection can create a perceived barrier to the therapeutic relationship, symbolically signifying that the patient is a biohazard. This can lead to a reluctance to don full PPE, especially during long-term, relationship-based care for chronic wounds or medication administration (Anderson et al., 2020). In general, medical practice, the architecture of older, converted residential buildings often lacks the negative pressure rooms, dedicated donning/doffing areas, and unidirectional patient flow that hospitals can theoretically muster. A general practitioner (GP) seeing a patient with a new cough in a small, windowless consulting room faces a real and present risk, magnified by the serial re-entry of subsequent patients into the same, potentially contaminated, confined space.

For dental professionals, PPE is not a pandemic novelty but a daily, legally mandated reality for aerosol-generating procedures (AGPs). The standard dental surgical ensemble—gloves, fluid-resistant surgical mask, eye protection, and tunic—is designed for blood and fluid splatter. The pandemic forced a rapid upgrade to fit-tested FFP3/N95 respirators and full-face shields for routine care

(Benzian et al., 2021). This transition was physically grueling but conceptually logical. However, it widened the gap between dental and other primary care colleagues. A physiotherapist providing hands-on manual therapy to a post-operative patient in a shared gym space has an equally intimate exposure profile but has not been socialized into the same rigorous, universal PPE culture as the dentist. The post-pandemic challenge is to synthesize the best of both worlds: dentistry's ritualized, almost surgical, discipline around PPE for procedures and the systemic, respiratory-focused vigilance demanded by emergent pathogens, and to standardize this across all community-facing professionals. The patient walking from the GP reception to the dental surgery and then to the pharmacy should be entering a unified safety culture, not three different microbiological risk zones with three different professional standards.

The Interprofessional Landscape: Discipline-Specific Challenges and Synergies

The IPC challenges of community care are best understood not as a monolithic deficit but as a mosaic of discipline-specific practices, barriers, and cultures. When these practices are viewed in isolation, critical vulnerabilities at the interfaces—the handoffs and shared spaces—remain invisible. An interprofessional analysis illuminates both the specific burdens borne by each profession and the potential for cross-disciplinary learning and shared protocols (Table 1).

Table 1: Interprofessional Analysis of IPC Practices and Barriers in Community Settings

Profession	Core IPC Activity in Community	Unique Setting-Specific Barrier	Interprofessional Interface Risk
Community Nursing	Wound care, catheter care, IV therapy, injection administration in the home.	Uncontrolled, non-clinical environment; lack of dedicated hand hygiene stations; patient/resident animal exposure.	GP prescribing IV antimicrobials without knowledge of home environment suitability; pharmacist compounding without home storage insight.
General Practice (Medicine)	First-point triage of undifferentiated febrile/respiratory illness; minor surgery; point-of-care testing.	High patient throughput in small, unventilated spaces; rapid turnover without terminal cleaning between patients.	Dental referral after AGP without communicating potential TB exposure; nurse phlebotomist not informed of patient's bloodborne virus status.
Dentistry	Aerosol-generating procedures (drilling, scaling); instrument sterilization; dental unit waterline management.	Aerosol settling time and surface contamination; complex semi-critical instrument reprocessing in absence of a central sterile services department (CSSD).	Medical GP managing a post-extraction infection unaware of dental unit waterline biofilm risk; pharmacist dispensing antibiotics without understanding procedure-specific infection risk.
Community Pharmacy	Aseptic compounding; point-of-care testing (glucose, INR, Strep A); vaccine administration.	Multi-use, high-touch retail environment with a mix of "shoppers" and "patients"; difficulty segregating infectious from non-infectious encounters.	Administering a live vaccine to an immunocompromised patient whose status is known to the GP but not communicated; advising on wound care products without seeing the wound.
Public Health	Outbreak investigation; contact tracing; population-level surveillance of notifiable diseases.	Time lag between primary care diagnosis and notification; incomplete clinical data from private providers (particularly dental and pharmacy).	A cluster of skin infections in a care home identified by a nurse is not triangulated with a spike in community antibiotic prescribing seen by the pharmacist until a public health alert is raised.
Allied Health	Hands-on manual therapy; rehabilitation equipment use in shared gyms; home visits for functional assessments.	Shared, high-contact equipment (therapy balls, parallel bars) without scheduled disinfection protocols between users; intimate physical proximity during gait training.	A physiotherapist treating a patient with a draining wound that the community nurse has dressed, without consistent, cross-professional communication on infection status.

Nursing Practice: The Mobile Vanguard of Community IPC

The community nurse is the linchpin of out-of-hospital clinical care, operating with a degree of professional autonomy that is unmatched in inpatient settings. They are the IPC practitioner, the educator, and the sentinel surveillance node, all rolled into one role. The domiciliary setting turns the nurse's car, their

bag, and their personal equipment into a mobile clinical unit, where contamination can easily move from one patient's home to another (Lee et al., 2019). The evidence consistently shows that the physical environment of care is a major determinant of IPC practice. A study by Shang et al. (2020) on infection risks in home healthcare identified the handling of the nursing bag as a critical control point. Placing a contaminated bag on the floor of a patient's home and then on the passenger seat of a car creates a fomite-mediated transmission pathway between unrelated households. Best practice involves a "clean side/dirty side" approach to the bag's interior, use of disposable under-pads to create a temporary clean field, and rigorous disinfection of high-touch items like stethoscopes and blood pressure cuffs between every single visit. However, enforcing these standards is nearly impossible without direct managerial observation, placing a heavy reliance on a deeply internalized, almost ritualistic, personal safety discipline (Cristina et al., 2021).

Beyond environmental control, the community nurse is the primary executor of invasive procedures outside the hospital. Urinary catheterization and central venous access device (CVAD) care in the home demand strict aseptic non-touch technique (ANTT), yet the evidence suggests a high rate of protocol drift. A mixed-methods study by Dowding et al. (2020) found that nurses frequently adapt ANTT principles to the "realities" of the home, citing poorly lit rooms, uncooperative pets, and the absence of an assistant as reasons for "clean technique" substitution. This normalization of deviance, where a once-sterile procedure becomes a clean one through repeated, unchallenged adaptation, is a significant driver of preventable community-acquired infections like catheter-associated urinary tract infections (CAUTI). The nurse's isolation is an asset for patient rapport but a profound vulnerability for IPC quality assurance. Interprofessional solutions, such as a pharmacist proactively reviewing the antibiotic susceptibility of a CAUTI identified by the nurse, or a GP adjusting a care plan based on the nurse's verbal report of the home's cleanliness, remain ad hoc rather than systematized.

Oral Healthcare: The Unique High-Risk, Aerosol-Dominated Environment

Dental practices are unique primary care settings that function as a convergence zone for chemical, biological, and physical hazards. The core IPC challenges—instrument reprocessing, dental unit waterline (DUWL) biofilm, and aerosol management—are technically demanding and largely invisible to non-dental colleagues, fostering a "black box" professional isolation that can compromise whole-system patient safety (Laneve et al., 2019).

The reprocessing of semi-critical instruments, such as handpieces, scalers, and extraction forceps, which contact mucous membranes but do not penetrate sterile body cavities, is a multi-step process of cleaning, disinfection, and sterilization. In hospitals, this is the domain of a dedicated, certified Central Sterile Services Department (CSSD) with engineered controls and validated processes (Mahasneh et al., 2020). In a community dental practice, it is the responsibility of the dental nurse (assistant), often working in a cramped, multi-function sterilization room that doubles as a dirty utility and clean supply storage area (Laneve et al., 2019). A study by Ling et al. (2023) auditing sterilization processes in over 100 general dental practices found that while autoclave biological indicators were often used, critical failures in the pre-sterilization cleaning phase were common. Residual bioburden—dried blood and tissue debris on a supposedly sterile instrument—can shield pathogens, including prions, from the sterilant. This failure mode is invisible to the naked eye and entirely unknown to the medical GP or community nurse who may later encounter a post-extraction infection or systemic bacteremia seeded from a dental source. The infection is documented in a medical chart with no feedback loop to the dental practice, preventing systemic learning.

The second unique challenge is the DUWL. The narrow-bore plastic tubing that delivers cooling water to high-speed drills and ultrasonic scalers is a perfect habitat for biofilm—complex, polymicrobial communities including Pseudomonas aeruginosa, Legionella spp., and non-tuberculous mycobacteria (Coleman et al., 2007). When DUWL output water, used as a coolant and irrigant during procedures, is aerosolized and directed into the surgical site (the tooth socket or periodontal pocket) and inhaled by the patient and clinical team, it represents a direct route of inoculation. Despite clear guidance to use sterile or potable water and to regularly shock-treat lines with disinfectant, adherence is variable and poorly audited. The episodic cases of Legionnaires' disease or invasive Pseudomonas infections traced to dental visits that sporadically appear in public health literature likely represent the tip of a much larger iceberg of subclinical, undiagnosed morbidity. This risk is entirely contained within the dental operatory and unknown to the wider primary care team, yet a patient who develops a persistent, culture-negative febrile illness post-dental treatment will cycle back into the GP surgery and community nursing services, incurring morbidity and investigation costs that no single professional sees in its entirety.

The General Practice and Pharmacy Interface: Shared Space, Divergent Responsibilities

The community pharmacy and the GP surgery are the most frequented touchpoints in primary care, and their physical and informational interface is a critical node for IPC. The pharmacy is increasingly a site of clinical care—vaccination, phlebotomy, point-of-care testing—but its fundamental architecture is that of a retail shop. A patient with a productive cough picking up an

amoxicillin prescription is standing next to an elderly person with COPD picking up their routine inhalers (Gubbins et al., 2017). The transactional, rapid-throughput nature of the pharmacy makes physical distancing and environmental cleaning in real-time extremely challenging. The pharmacist's IPC training has traditionally emphasized product safety—aseptic technique for compounding—over contact and droplet precautions for customer interaction, a gap that COVID-19 exposed but that has yet to be fully and permanently closed with standardized, observable practice across the profession.

Simultaneously, the GP surgery's reliance on non-clinical reception and administrative staff as the first point of patient contact creates a critical risk that standard precautions do not adequately address. These staff are not clinically trained to recognize a productive cough or a slapped-cheek rash as a potential infectious risk, yet they make the first, often instinctive, triage decision about where a patient should wait and for how long (Fasugba et al., 2021). A failure in this administrative screen funnels a potentially infectious patient into a shared waiting room. The interface risk extends to allied health: a physiotherapist treating a patient for persistent back pain in a shared gym may be unaware that the same patient is on immunosuppressive therapy dispensed by the community pharmacist. The GP holds this information, the pharmacist dispenses the medication, the nurse sees the patient for a blood test, and the physiotherapist performs hands-on therapy—four professionals, one patient, and no shared IPC risk assessment. This fragmentation of information and responsibility is the central interprofessional failure that transforms a contained clinical risk into a community transmission event.

Epidemiological Surveillance: The Missing Link in Community IPC

Surveillance is the eyes and ears of an effective IPC program, transforming isolated, anecdotal infections into actionable epidemiological intelligence. In hospital settings, surveillance for HAIs like MRSA bacteremia and C. difficile infection is mandated, resourced, and integrated into daily clinical workflows. In the community, however, surveillance is a fragmented archipelago of siloed systems that rarely communicate, creating a blind spot that covers the majority of healthcare interactions.

The Surveillance Gap Between Community and Hospital

The critical disconnect is the informational firewall between primary care and the public health system. A cluster of three cases of C. difficile in a single GP surgery, a spike in infected eczema in a particular nursing home catchment area, or two cases of non-tuberculous mycobacterial infection in patients who attended the same dental practice in the same month—these events are local epidemiological "smoke signals" that, if detected in real time, could trigger an outbreak investigation and prevent further cases. Instead, they are typically managed as individual clinical episodes. The GP treats the patient, the dentist treats the patient, the pharmacist dispenses the antibiotic, and the microbiological reports sit in separate, unlinked databases (Mremi et al., 2021). The laboratory may notice a species-level cluster if the same unusual organism is cultured, but the time lag and the lack of integrated community identifiers mean the signal is often lost.

Public health units, particularly those with limited resources, are structurally reactive, responding to a spike in officially notifiable diseases that have already breached a statistical threshold, rather than proactively scanning for emergent clusters in real-time primary care data. The COVID-19 pandemic momentarily accelerated the development of integrated surveillance dashboards linking testing sites, GP practices, and hospitals. Post-pandemic, the systemic inertia to revert to pre-existing silos threatens to squander this hard-won progress. A systematic review by McGowan et al. (2022) on community AMR surveillance found that less than 25% of high-income countries have a functioning, real-time data linkage between community antibiotic dispensing and primary care infection diagnosis, meaning that empirical antibiotic therapy in the community is guided by regional, often outdated, hospital-centric antibiograms rather than local, community-specific resistance patterns.

Sentinel Surveillance Through Interprofessional Collaboration

The untapped potential of community surveillance lies in the interprofessional team as a distributed sensor network (Taib et al., 2021). Each professional group—nurses, GPs, dentists, pharmacists—collects a different, complementary data stream that, if integrated, would create a rich, multi-dimensional picture of community infection dynamics. The community nurse, entering dozens of homes each week, is a first-line epidemiological observer. She is uniquely positioned to note, for instance, that several residents in a sheltered housing complex are developing similar, infected leg ulcers (Madi et al., 2022). The community pharmacist, dispensing over-the-counter and prescription medications, can detect a spike in sales of anti-diarrheal medication in a neighborhood, a potential early signal of a waterborne norovirus outbreak. The dentist, observing a pattern of acute necrotizing ulcerative gingivitis (ANUG) in otherwise healthy young patients, may be the first clinician to see a signal of underlying HIV or severe immunosuppression in a community (Rosa & Setiadhi, 2023).

However, this distributed intelligence network cannot function without a deliberate communication infrastructure. A qualitative study by Zaildo et al. (2023) on IPC communication pathways found that community clinicians almost never report their clinical "gut feeling" of an unusual cluster to a public health authority unless mandated by law for a

specific notifiable disease. The barriers are practical (time, lack of a simple reporting mechanism) and psychological (fear of being wrong, not seeing it as part of one's professional role). Building a culture of shared epidemiological awareness requires creating simple, low-friction "red flag" referral pathways and, crucially, a feedback loop where the public health team acknowledges and acts upon the intelligence, closing the communication circle and reinforcing the value of the sentinel reporter. This transforms the pharmacist or dentist from a passive data generator to an active, respected node in the public health surveillance network—a profound cultural re-alignment from private practitioner to community health guardian (Tan et al., 2020).

Education, Collaboration, and the Path to a Shared Safety Culture

The chasm between the evidence of what constitutes effective IPC and the reality of its inconsistent implementation across community settings is not primarily a knowledge deficit. It is a cultural and systemic implementation failure. The solution must therefore target not just individual knowledge, but the shared values, attitudes, and interprofessional behaviors that constitute a culture of safety.

Breaking Down Educational Silos: The Case for Interprofessional IPC Education

The traditional model of IPC education is a perfect mirror of professional isolation. A nursing student learns about wound asepsis in a nursing lab. A dental student learns about autoclave validation in a dental simulation unit. A pharmacy student learns about clean room design in a pharmacy school. They never practice a shared scenario together, never debate the conflicting demands of their respective guidelines, and never learn a common language of risk communication (Barr et al., 2017). When they meet in the real world, they discover that their "non-negotiable" standard precautions are subtly but significantly different, a discovery that breeds mutual distrust. The nurse sees the dentist's environmental cleaning protocol as lax; the dentist sees the nurse's mobile phone hygiene as appalling. Both are often correct.

The antidote is integrated, simulation-based interprofessional education (IPE) that is explicitly designed around shared IPC competencies. Imagine a simulation where a single standardized patient, scripted with a draining community-acquired MRSA wound and a dental abscess, moves through a primary care pathway: a consultation with a GP student and a pharmacy student, a home wound dressing by a nursing student, and an extraction by a dental student (Grosser et al., 2020). The learning objective is not each profession's specific task but the shared responsibility of preventing MRSA transmission across these encounters. Debriefing would focus on the handoff communication failures, the environmental contamination of shared equipment, and the collective failure to see the patient as a vector moving through a fragmented system (Reeves et al., 2016; Evans et al., 2019). Such training, if embedded in pre-licensure curricula and reinforced in post-graduate continuing professional development (CPD) cycles, would build a generation of practitioners with a shared mental model of community IPC. The physiotherapist who understands the logic of the nurse's ANTT approach, the pharmacist who grasps the rationale for the dentist's DUWL disinfection protocol, becomes an ally in reinforcing, rather than unwittingly undermining, the safety behaviors of another profession (McCabe et al., 2021).

Leadership and Accountability in the Community

A "culture of safety" is a phrase often invoked and poorly defined. In the context of community IPC, it means an environment where every staff member, from the receptionist to the senior partner, feels a personal responsibility for infection risk and is psychologically safe to speak up about breaches without fear of blame or ridicule (Sammer et al., 2010). This is markedly harder to achieve in a distributed community setting than in a single, hierarchical hospital.

In a GP practice, the business partners are the clinical and managerial leaders, and their visible, consistent prioritization of IPC—allocating budget for ABHR dispensers in every room, modeling perfect hand hygiene, redesigning waiting rooms with respiratory season in mind—sets the behavioral ceiling for the entire practice. In a dental practice, the principal dentist's attitude toward auditing the sterilization logbook (a leadership check versus a perfunctory signature) determines the entire team's diligence. In a community pharmacy, the superintendent pharmacist's design of the consultation zone, separating the retail flow from the clinical care flow, is a practical act of cultural leadership.

Crucially, a safety culture requires a shift from a sole focus on individual compliance ("Did Nurse X wash her hands?") to a systems-thinking approach ("Why is our consultation room layout making it physically difficult for Nurse X to wash her hands at the right moment?"). The community setting lacks the institutional safety net of a hospital's infection control committee, making proactive, local, interprofessional risk assessment essential.

A simple, quarterly "safety huddle" where the practice nurse, a GP, the practice manager, and a visiting pharmacist or district nurse representative meet to review a recent infection event (e.g., a sharps injury, a cluster of skin infections) is a low-cost, high-impact intervention. It forces a shared review of a local failure and generates a cross-disciplinary action plan (Harun et al., 2022). An analysis by Tropea et al. (2023) of IPC leadership in primary care found that practices with a designated, non-physician IPC lead—often a senior nurse—who is given protected time and explicit authority, significantly outperform their peers on standardized IPC audit scores. This structural

empowerment moves IPC from an invisible, everyone-and-no-one's responsibility to a visible, accountable professional role that bridges professional hierarchies (Table 2).

Table 2: Key Interprofessional Recommendations for Strengthening Community IPC

Strategic Domain	Recommendation	Interprofessional Rationale & Lead Discipline(s)
Education & Training	Implement mandatory, simulation-based IPE on community IPC scenarios (e.g., MDRO pathway, AGP transmission) during pre-licensure and CPD.	Joint leadership from Nursing, Dentistry, and Pharmacy education deans to design unified competency frameworks.
Standardized Protocols	Develop a single, cross-sector, minimal "Community Standard Precautions" checklist, co-designed and endorsed by all professional colleges.	Public Health-led, with equal contribution from clinical working groups of all six disciplines to ensure contextual feasibility.
Epidemiological Surveillance	Establish a real-time, integrated community surveillance dashboard linking GP, dental, pharmacy, and nursing home data with automated cluster alerting.	Public Health (data analysis & governance), with mandatory data contribution from GP, Pharmacy, and Dental IT systems.
Physical Environment	Design a mandatory, funded IPC infrastructure standard for community clinics, including ventilation, hand hygiene stations, and spatial separation of clean/dirty workflows.	Allied Health & General Practice leadership advocating for infrastructure investment, informed by Nursing and Dental operational expertise.
Leadership & Governance	Every community health organization (practice, pharmacy, nursing team) must have a designated, non-physician IPC lead with protected time and regulatory authority.	Community Nursing provides the clinical expertise; Practice Management provides the operational resources; Regulator provides the mandate.

The Interprofessional Imperative for Community IPC

This review's synthesis of evidence from across six core primary care disciplines reveals a central, unifying truth: the current model of profession-specific, siloed IPC practice is structurally incapable of managing the infection risks of modern, integrated community care. The patient does not experience care as a series of discrete, professional encounters. Their journey is a continuous pathway through a landscape of interconnected risks. A contaminated surface in a physiotherapy gym, a poorly sterilized dental handpiece, a lapse in domiciliary wound asepsis, and an unventilated GP consultation room are not separate problems; they are nodes in a single, system-wide transmission network. A failure at any one node can trigger a cascading failure of patient safety, yet the responsibility for preventing that failure is currently fractured across multiple professional tribes with different languages, cultures, and accountability structures.

The evidence on standard precautions demonstrates that while all professions cognitively accept their importance, contextual barriers lead to a predictable, profession-specific pattern of non-adherence. The nurse's struggle is with environmental chaos; the dentist's is with technically complex equipment reprocessing; the GP's is with rapid patient turnover; the pharmacist's is with a retail-clinical hybrid identity; the allied health professional's is with shared, high-contact rehabilitation equipment. A generic, universal IPC training module addresses none of these nuanced realities. However, simply creating six profession-specific modules misses the deeper point. The most dangerous infection risks occur not within each profession's controlled bubble of practice but at the interfaces: the referral, the shared waiting room, the uncommunicated lab result, the patient transferred from a care home. These interfaces are interprofessional by definition, and their safety can only be assured by interprofessional solutions. A standardized, cross-sector communication tool for flagging a known or suspected infectious risk during any patient referral—medical, dental, or allied health—would be a foundational patient safety intervention.

The surveillance gap is arguably the most critical system vulnerability identified in this review. We cannot manage what we do not measure. The community remains a vast epidemiological blind spot, with an unknown burden of HAIs occurring silently in homes and primary care clinics, disconnected from the sophisticated surveillance machinery that monitors the inpatient sector. The model of the interprofessional team as a distributed sentinel surveillance network—where the nurse, pharmacist, and dentist are active, valued reporters of anomalous clinical clusters—represents a paradigm shift from passive, laboratory-driven surveillance to active, clinically-driven event monitoring. Technology alone will not achieve this; it requires a cultural redefinition of the community clinician's professional identity to include a proactive public health responsibility. The quarterly interprofessional safety huddle, reviewing a de-identified local case, can be the foundational ritual that

builds this shared identity and local epidemiological awareness.

The limitations of this narrative review must be acknowledged. The breadth of the topic necessitated a selective rather than exhaustive review of the literature, and the synthesis reflects the author's interpretative framing. The focus on six specific disciplines, while broad, omits other key community actors, such as paramedics, podiatrists, and social care workers, whose integration is equally critical. The evidence base varies significantly in depth across disciplines, with nursing and dentistry having more mature, empirical IPC research traditions compared to a relative paucity of robust studies in community pharmacy and allied health IPC practices. This asymmetry itself is a finding, highlighting an urgent research priority. Furthermore, the recommendations for interprofessional education and integrated surveillance are necessarily broad and must be adapted to local regulatory, financial, and cultural contexts.

Notwithstanding these limitations, the review provides a robust, multi-faceted argument for a fundamental reorientation. The clinical bottom line is that a patient receiving coordinated community care should experience a seamless, consistent, and predictably safe IPC environment, regardless of which professional's door they are walking through. Achieving this requires moving IPC from a property of the individual professional to a property of the interprofessional system—a shared, non-negotiable culture of safety that is as central to the identity of community care as the diagnostic skills and therapeutic relationships that define its clinical excellence. The choice is not between interprofessional IPC and no IPC; it is between a model that recognizes and manages the complex, interactive reality of community infection risk, and a model that remains trapped in a dangerous, obsolete fiction of professional isolation.

Conclusion

Infection prevention and control in community and primary healthcare settings is a complex, interprofessional challenge that demands an integrated response. This review has demonstrated that the six core community-facing professions—nursing, medicine, dentistry, pharmacy, public health, and allied health—each possess distinct IPC strengths, vulnerabilities, and behavioral cultures. When these operate in isolation, the gaps at their interfaces become the primary loci of preventable infection transmission. The patient journey, fluidly crossing professional boundaries, exposes the inadequacy of siloed, profession-specific IPC protocols. A nurse's lapse in home care asepsis, a dentist's invisible DUWL biofilm, and a GP's poorly ventilated consultation room are not separate problems but interconnected risks in a single, fragmented system.

The path forward is unequivocally interprofessional. Integrated, simulation-based education must build a shared mental model of safety from the earliest stages of professional training. Standardized, cross-sector protocols must replace the current patchwork of conflicting guidelines. Most critically, community-based epidemiological surveillance must be re-imagined as a distributed, interprofessional intelligence network, transforming every clinician into a valued sentinel of public health. This requires not just new technology but a profound cultural shift—a redefinition of professional identity that embraces shared accountability for the patient's entire journey. The vision is of a community health system where the question "Is this environment, this equipment, this handoff, safe from an infection risk?" is asked and answered collectively by a team that speaks a common language of prevention. This shared culture of safety is the irreducible foundation upon which the clinical excellence and patient-centered promise of community care must be built.

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