


# Creating a path forward: understanding the context of sexual health and sexually transmitted infections in American Indian/Alaska Native populations – a review

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## ABSTRACT

This review assessed sexual health and sexually transmitted infection (STI) burden among American Indian/Alaska Native (AI/AN) peoples within the context of current clinical and public health services. We conducted a review of published literature about sexual health and bacterial STIs among AI/AN populations in the United States using Medline (OVID), CINAHL (EbscoHost) and Scopus. Peer-reviewed journals published during 1 January 2005–2 December 2021 were included and supplemented by other publicly available literature. A total of 138 articles from reference lists met inclusion criteria, including 85 peer-review articles and 53 additional references. Results indicate a disproportionate burden of STIs is carried by AI/AN populations compared to non-Hispanic Whites. Risk for STIs in AI/AN people has origins in historical trauma and structural and social determinants of health. STI services are available for AI/AN populations, but many barriers to care exist. Community-based sexual health programming has been successful, but has thus far focused primarily on adolescents and young adults. A myriad of factors contributes to high rates of STIs among AI/AN populations. Longstanding disparities show a clear need to increase the availability of integrated, low-barrier STI prevention and treatment services. Implementation of multi-level (individual, physician, clinic, healthcare organisation, and/or community level), culturally relevant sexual health and STI interventions should be community-based and person-centred, acknowledge social determinants of health, and grounded in deep respect and understanding of AI/AN histories and cultures.

**Keywords:** American Indian/Alaska Native, chlamydia, congenital syphilis, disparity, gonorrhoea, sexual health, STI, STD, syphilis.

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## Understanding context

### Contemporary American Indian/Alaska Native populations in the United States

The Indigenous populations of what is now the United States (US) represent a heterogeneity of distinct tribes and people whose connections to culture, land, and environment span time immemorial. The word Indigenous describes a group of people native to specific lands, whose origins predate colonisation and subsequently imposed geopolitical borders. In this paper, the term American Indian/Alaska Native (AI/AN) will be used to refer to the Indigenous peoples of the US.

AI/AN tribes are recognised as sovereign political nations within the US. Currently, there are 574 federally recognised tribes and more than 100 state recognised tribes.<sup>1</sup> Federally recognised tribal nations have the sovereign right to self-governance of their tribal members and lands, and maintain direct political relationships with the US federal government.<sup>2</sup>

AI/AN tribes have their own cultures, histories, languages, and world views that are visible and flourishing in the present. An estimated 7.1 million persons – 2.1% of the US population – identify as AI/AN, either solely or in combination with other races or ethnicities.<sup>3</sup> Approximately 70% of AI/AN people live in urban spaces and 30% live on tribal lands including reservations, off-reservation land trusts, tribal statistical areas or within an Alaska Native Regional Corporation's land holdings.<sup>4–6</sup>

## Health care for American Indian/Alaska Native populations in the United States

Since the 18th century, AI/AN tribes have ceded large swaths of land to the US federal government, often by force, in exchange for payments and services such as medical care, to be provided in perpetuity. Hundreds of treaties codified these agreements and define the US federal government's ongoing legal obligation to health care for AI/AN people.<sup>7–9</sup>

Today's healthcare facilities for AI/AN people, known as the Indian Health System, have emerged from this legacy as 'the first and largest prepaid health plan in history, paid for by the land and resources given up by tribal nations'.<sup>7</sup> This decentralised constellation of federal, tribal, and urban medical centres serves 2.6 million AI/AN people in 37 states, and is administered by the Indian Health Service (IHS), a federal agency.<sup>4,10</sup> Although AI/AN people can access health care outside the Indian Health System, its facilities are often the only option on geographically isolated tribal nations and for AI/AN people who do not have public or private health insurance.<sup>11</sup> Medical services within the Indian Health System are provided at no financial cost to the individual AI/AN person. Healthcare resources are limited across the Indian Health System in the context of annual per-capita healthcare expenditures of approximately US\$4000, compared with the US national average of US\$9409.<sup>12</sup> The Indian Health System is also understaffed, with 25% of provider positions vacant.<sup>13</sup> These and other resource limitations severely constrain the ability of Indian Health System facilities to provide ambulatory, emergency, and inpatient services.

Disparate health outcomes are well documented among AI/AN populations.<sup>14</sup> Incident sexually transmitted infections (STIs) in the US are historically high, and AI/AN populations are disproportionately impacted by gonorrhoea, chlamydia, syphilis, and trichomoniasis compared to non-Hispanic Whites.<sup>15</sup> Yet, there is a paucity of literature on the sexual health of AI/AN people and the context for this STI burden. Herein, we employ a literature review and publicly available references to describe sexual health behaviours among AI/AN people and review associated STI epidemiology, clinical services, and public health interventions for these populations. We provide recommendations to improve the quality and accessibility of future sexual health services for

AI/AN populations – derived from the authors' expertise working in tribal, governmental, and academic settings across the US.

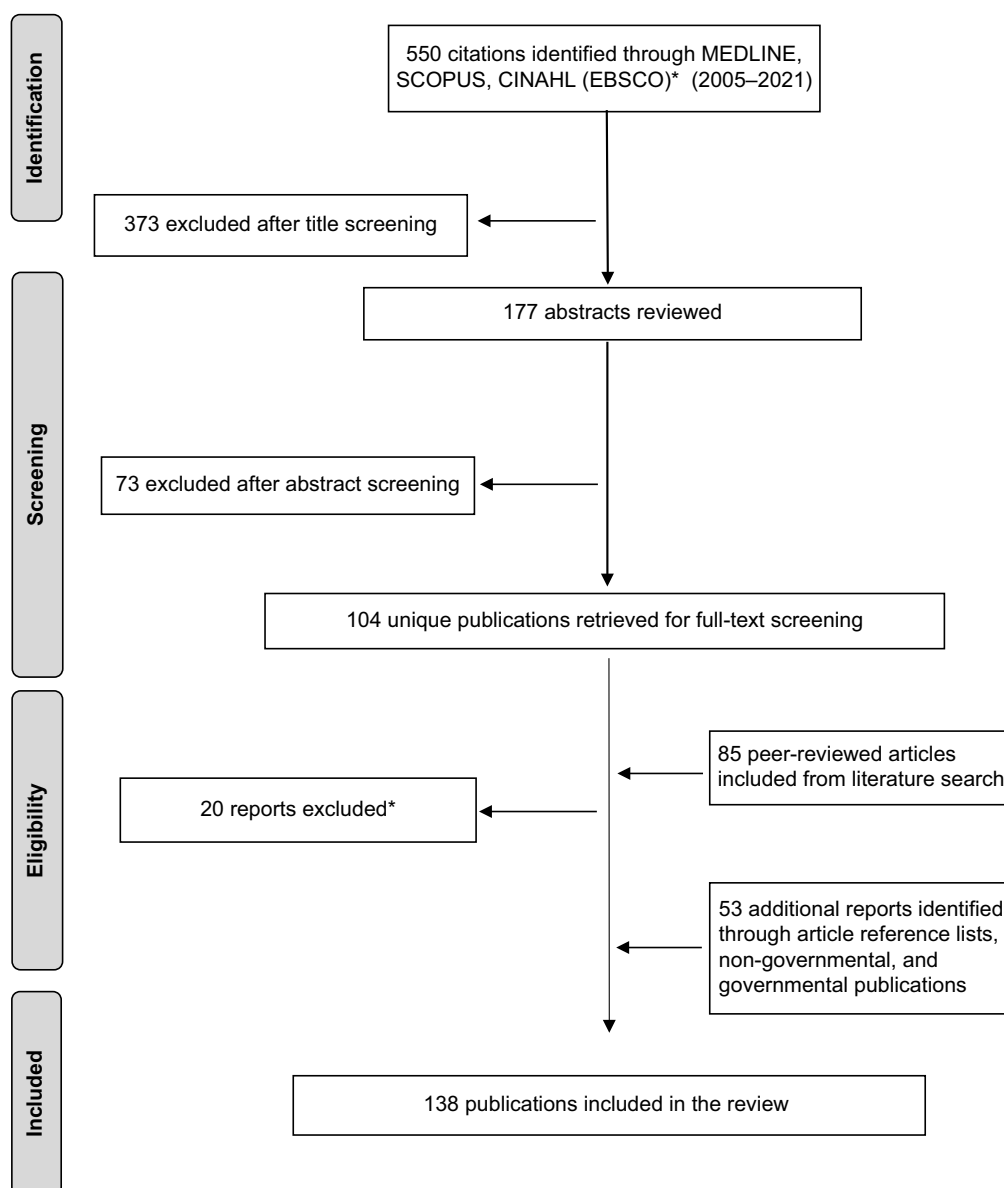
## Methods

A review of published literature was conducted in Medline (OVID), CINAHL (EbscoHost), and Scopus using the search terms: 'American Indian OR Native American OR Alaska Native AND STI OR STD OR sexual health OR syphilis OR gonorrhea OR chlamydia OR trichomoniasis' on 2 December 2021, for the publication period 1 January 2005 to 2 December 2021. Duplicates were identified and removed using the Endnote (Clarivate) automated 'find duplicates' function, with preference set to match on title, author, and year. Two authors independently reviewed titles and abstracts for inclusion of topics related to sexual health and STIs. Full-texts were then screened for relevance, and discrepancies discussed by author teams. Manuscripts describing STI epidemiology, social and behavioural context, clinical service delivery, and public health research and interventions for AI/AN populations were included. Publications that focused singularly on HIV, viral hepatitis, or human papillomavirus and those specific to Indigenous people of North America but outside the US were excluded. In supplement to the literature review, other published sources of information on AI/AN sexual health and STI services were included by reviewing reference lists from reviewed articles, hand searching publicly available information from governmental and non-governmental agencies, investigation papers and reports of key guidelines and research. Authors were intentionally selected for their work and leadership in the field AI/AN health, sexual health, STIs, academia and medicine. This manuscript was developed with the collective knowledge of the authorship cohort, based in their professional experience and relationships with people and place.<sup>16</sup>

## Results

### Literature review

Of 550 titles plus abstracts screened, 104 full-text articles from peer-review journals were assessed. Of these, 85 were included in this review due to their relevance to STI epidemiology ( $n = 20$ ), social and behavioural context ( $n = 24$ ), clinical service delivery ( $n = 10$ ), and public health research and interventions ( $n = 31$ ) for AI/AN populations. An additional 53 references were included pertaining to the topics described above (Fig. 1)



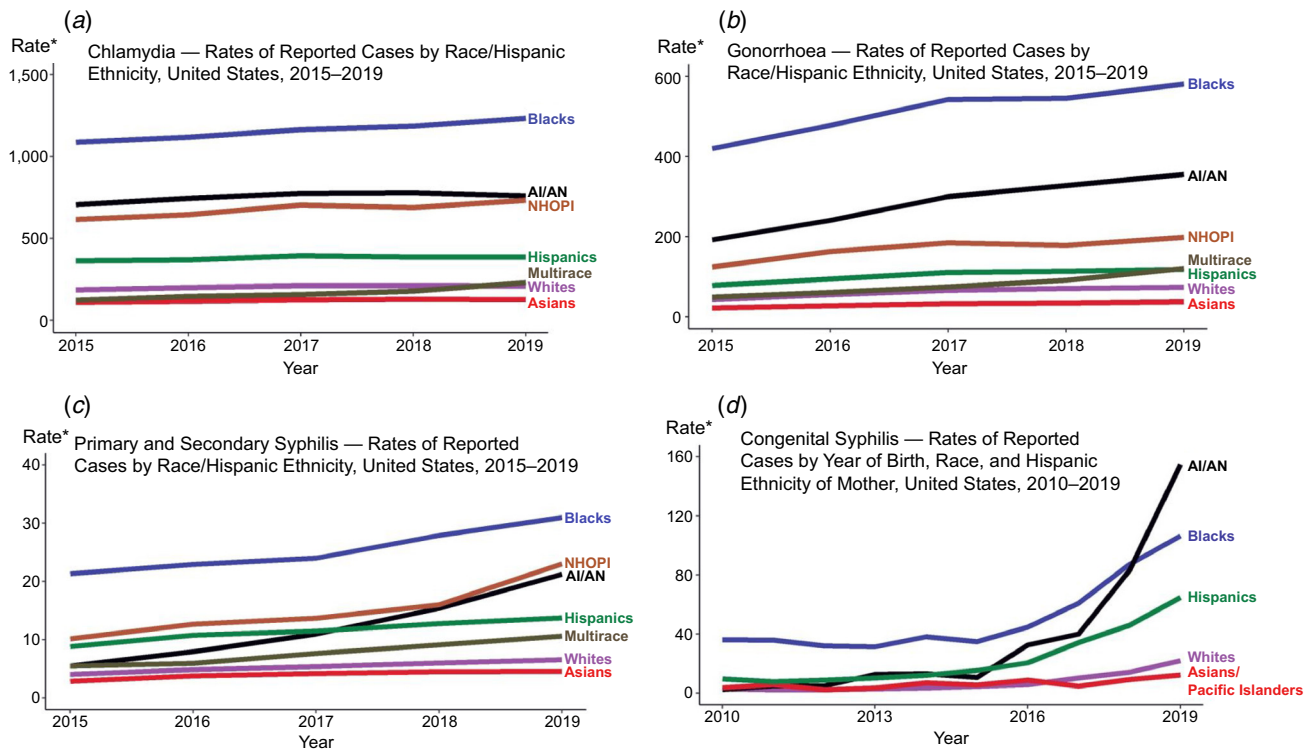
1. Search terms: "American Indian OR Native American OR Alaska Native AND STI OR STD OR sexual health OR syphilis OR gonorrhea OR chlamydia OR trichomoniasis." Search performed by U.S. Centers for Disease Control (CDC) Library December 2, 2021.
2. Duplicates were identified using the Endnote automated "find duplicates" function with preference set to match on title, author and year, and removed.
3. Total excluded articles based on eligibility criteria not being met = 466.

**Fig. 1.** Literature search flow diagram.

### STI epidemiology among American Indian/Alaska Native populations

Of the 24 references that met eligibility requirements, the majority<sup>14</sup> included multiple reportable STIs (gonorrhoea, chlamydia syphilis). Topic-specific articles included chlamydia,<sup>2</sup> gonorrhoea,<sup>2</sup> syphilis,<sup>1</sup> trichomoniasis,<sup>1</sup> ectopic pregnancy,<sup>1</sup>

risk factors for STIs,<sup>1</sup> infertility,<sup>1</sup> and other.<sup>1</sup> The studies were primarily about incidence/surveillance,<sup>12</sup> prevalence,<sup>4</sup> guidance or mapping,<sup>3</sup> and a literature review.<sup>1</sup> Of the references that reported surveillance data, the sources were primarily state- or national-level reportable STI data,<sup>10</sup> facility-level patient records,<sup>2</sup> survey,<sup>1</sup> and multiple sources.<sup>1</sup>



**Fig. 2.** Rates of reported (a) chlamydia, (b) gonorrhoea, (c) syphilis, and (d) congenital syphilis by race/Hispanic ethnicity, United States, 2015–19.

AI/AN persons, specifically those aged 15–24 years, as well as women,<sup>A</sup> have an increased STI burden compared to non-Hispanic Whites.<sup>17</sup> This disparity in reported incidence and prevalence data<sup>18–24</sup> ranges from primary STIs to sequelae of untreated infections (infertility, ectopic pregnancy, pelvic inflammatory disease and adverse birth outcomes).<sup>24–27</sup> Regional differences in STIs among AI/ANs are notable.<sup>24,26,28–36</sup> In 2019, the incidence of chlamydia and gonorrhoea among AI/ANs was 3.8- and 4.4-fold higher, respectively, compared with non-Hispanic Whites. For AI/AN women, the incidence of primary and secondary syphilis was three-fold higher than that for non-Hispanic White women (15.4 vs 2.3 per 100 000). Syphilis infection rates were also higher compared to non-Hispanic White males (27.1 vs 11.0/100 000). Congenital syphilis cases among AI/AN were higher than for any other race or ethnicity in the US, increasing from 10.7 cases per 100 000 in 2015 to 154.9 per 100 000 in 2019, a 1348% increase.<sup>17</sup> Temporal trends by reportable STI and race/ethnicity are presented in Fig. 2.

Cases of chlamydia, gonorrhoea, and syphilis (including congenital syphilis) are reportable to public health entities.<sup>37</sup> However, AI/AN people are routinely undercounted in surveillance due to racial misclassification attributable to mistaken assumptions about racial identity within medical

and public health spaces, or by AI/AN identity being hidden in datasets using ‘multiracial/ethnicity’ or ‘other’ race categories.<sup>38,39</sup> Unpublished studies of AI/AN misclassification in the Pacific Northwest have found between 8% (in Washington) to 34% (in Oregon) of AI/AN HIV and STI cases had missing or incorrect race information (S. Joshi, pers. comm., January 2022).

### Social and behavioural context for sexual health among AI/AN populations

Of the 32 references that met eligibility requirements, 15 included sexual risk: substance use;<sup>8</sup> violence;<sup>4</sup> mental health;<sup>2</sup> and prevention.<sup>1</sup> Eleven of the articles focused on gender and sexuality. Historical trauma or history was the focus of eight articles. Social determinants of health and medical mistrust was the focus of four articles each. Overlapping of article focus occurred with historical trauma/history,<sup>5</sup> gender and sexuality<sup>3</sup> and social determinants of health.<sup>2</sup>

Indigenous societies had complex and fluid values on identities, relationships, and sexuality, with expansive models of kinship, relationality, gender and sexual diversity. Indigenous practices, such as open sexual expression, multiple sexual or life partners, same-sex sexual practices, and third and

<sup>A</sup>We utilise the term ‘women’ to refer to individuals assigned female at birth, ‘men’ to refer to those assigned male at birth. Due to limitations in available data, we can not describe epidemiology for gender-diverse AI/AN persons.

subsequent gender systems, are thought to have been commonplace and accepted prior to colonisation by Europe.<sup>40–48</sup>

Colonisation and forced assimilation drastically altered the lives of AI/AN people and communities. It severed connection to land, language and culture, removed children from community to boarding schools or foster families, and more.<sup>49</sup> Traditional coming-of-age teachings, social roles, and familial relationships were disrupted and replaced by colonial frameworks of kinship, sex, sexuality, and gender.<sup>50,51</sup> This history has caused specific trauma to AI/AN people, termed ‘historical trauma,’ which is a cumulative emotional and psychological wounding over the lifespan and across generations, emanating from massive trauma. Among AI/AN people, historical trauma is expressed as depression, post-traumatic stress symptomology, low self-esteem, substance use and harm to self or others.<sup>50,52</sup> This legacy has shaped the landscape of sexual health among AI/ANs into the present.<sup>50,53</sup>

For many AI/AN people, mistrust of medical systems is rooted in the aforementioned legacy of colonisation<sup>50,54</sup> and continued with sterilisation of women and gender-diverse persons with ovaries, disenfranchisement from abortion services, among numerous other examples.<sup>55,56</sup> This mistrust from past and present-day actions may hinder STI-related interventions at both the individual and systems level.<sup>57,58</sup>

STIs among AI/AN people are associated with many factors: poverty, healthcare access, socioeconomic, experience in the correctional system, physical and sexual victimisation, and insufficient sexual health education.<sup>39,59–63</sup> Furthermore, substance use, social pressures, depression, anxiety, ambivalence towards protected sexual intercourse, and experiences of historical trauma influence behaviours that increase STI risk.<sup>52,61,64–70</sup> Examples include Two Spirit and LGBTQ+ people being alienated from their tribal ceremonial and social communities due to transphobia and homophobia that leads to stigma,<sup>71</sup> intense social pressure for early sex among AI/AN youth that is often associated with substance misuse,<sup>39</sup> and intimate partner violence influencing person-level disempowerment and inability to seek reproductive and STI services.<sup>72</sup>

## Clinical service delivery

Thirty-two references described STI clinical services, of which 15 were reference materials such as policies, guidelines, regulations, or strategic plans. The remaining citations comprised mainly of observational studies on STI screening. These included the use of informatics to increase STI screening,<sup>6</sup> response to local- or state- level increases or outbreaks of STI in AI/AN communities,<sup>4</sup> expedited partner therapy,<sup>1</sup> home-based STI test kits,<sup>1</sup> and a state-level AI/AN clinical services assessment.<sup>1</sup> There were three community-facing research studies evaluating knowledge and utilisation of sexual health services. Six references described an outbreak response for syphilis<sup>4</sup> and gonorrhoea.<sup>2</sup>

STI testing and treatment within the Indian Health System are primarily provided in outpatient clinics and emergency departments<sup>37,73–81</sup> and are delivered according to national guidelines.<sup>73</sup> Expedited partner therapy (EPT) is available in some clinical settings.<sup>73</sup> IHS has a National Pharmacy and Therapeutics Committee, which includes approving STI medications for formulary and associated guidance.<sup>82</sup> Many Indian Health System facilities take advantage of free or reduced-price medications, either via pharmaceutical companies or government public health pricing.<sup>83,84</sup> Clinical decision support in electronic health records is utilised at many facilities as testing bundles or screening reminders for bacterial STIs and HIV with a single order set to enhance screening.<sup>76–79</sup> In some situations, such as outbreaks or in review of local epidemiology, STI screening and clinical decision support can be expanded based on local policy and practice needs.<sup>77,80,81</sup>

In comparison to non-Hispanic Whites, AI/AN men and women have been reported to more likely seek STI services.<sup>85,86</sup> Yet, in 2019, nationally recommended routine annual chlamydia screening coverage among women aged 16–25 years in IHS facilities was 35%, with a wide range of delivery across sites (0–54%) (A. Apostolou, pers. comm., February 2022). This screening coverage has proven difficult to improve; data from 2009 shows an average chlamydia screening coverage of 32%, with a range of 7–51%.<sup>87</sup> However, data on the use of STI clinical services and recommended screening coverage by AI/AN populations are very limited, largely due to a decentralised reporting system.

## STI case investigation, partner services and outbreak response

Collaboration between Indian Health System clinics and state and county STI programs facilitate case investigation and the delivery of partner services (notification of exposure and referral to care) to persons diagnosed with STIs.<sup>80,81,88,89</sup> Tribal, county, state and federally assigned disease intervention specialists can deliver partner services and treatment referrals for AI/AN populations. The 2021–25 National STI Strategic Plan calls for improved support to AI/AN populations, and recent increases in federal funding for public health capacity building include disease intervention staff.<sup>90,91</sup>

Tribal and federal Public Health Nurses (PHN) frequently serve in many roles to combat the spread of STIs in AI/AN communities; these include case-finding, therapeutic and preventive interventions. Per-patient referral and follow up, PHNs conduct home visits for STIs and other communicable disease investigation and can assess and treat patients according to established protocols, in consultation with their referral provider.<sup>92,93</sup> The PHN expertise in communicable disease treatment, assessment, outreach, investigation, and surveillance is critical to manage and prevent the spread of STIs and is enhanced by conducting visits outside of clinical



settings such as a patient's home, homeless shelters or health fairs.

STI outbreaks in tribal nations can be identified quickly, as populations tend to be smaller and clinic staff can observe and report increases in cases. Tribal, county, state and federal public health entities have collaborated to bring needed skill sets and resources to address STI outbreaks, upon request of tribal nations.<sup>36,80,81,88,89,94</sup> Inter-agency communication and collaboration were able to identify and respond to recent surges of adult and congenital syphilis cases across the tribal nations in the US.<sup>36,80,81,94</sup>

### Community-based clinical innovations

Under-prioritisation of public health<sup>95</sup> and disease investigation<sup>96</sup> at national, regional, and local levels has resulted in limited staff support for STI case investigation in many tribal areas. Some tribes have been able to respond by investing in locally grown solutions. For example, Community Health Aides and Practitioners (CHA/Ps) were developed in Alaska in the 1950s as a direct response to pressing health concerns, such as the tuberculosis epidemic, where local lay villagers were trained to help Alaska Native people in need of treatment and care. Today, CHA/Ps function as an essential part of the healthcare team. They assess and provide primary and preventive care and health education in geographically remote Alaskan communities, which helps to address STIs among innumerable other health concerns.<sup>97</sup>

Issues of confidentiality and embarrassment has been shown to impact sexual health-seeking behaviour in rural and remote communities where clinical staff are oftentimes family, and the next closest clinic is a plane ride or 3-h drive away (Tulloch S, de Ravello L, Taylor M, unpubl. data).<sup>98</sup> In response to community concerns about confidentiality and privacy, geographic isolation, and limited options for STI testing, the Alaska Native Tribal Health Consortium and Intertribal Council of Arizona have partnered with Johns Hopkins University to offer 'I Want the Kit,' a no-cost mail-based self-swab test for chlamydia, gonorrhoea and trichomoniasis with follow-up case management from a provider to those who test positive.<sup>99</sup>

Effective communication and training of a disbursed workforce on screening and treatment guidelines, best practice and changes in care can be difficult in a system that spans 39 states and lacks a formal structure and policies.<sup>100</sup> To address this problem, the Northwest Portland Area Indian Health Board created Indian Country ECHO (Extensions of Community Health Outcomes). The Indian Country ECHO program creates space for clinical providers to collaborate and share knowledge, enhancing providers' ability to offer AI/AN people the best care possible in rural settings. Based on the University of New Mexico's ECHO Program,<sup>101</sup> the

Indian Country ECHO community offers friendly, interactive online learning environments where clinicians and staff serving AI/AN patients can connect with peers, engage in didactic presentations, collaborate on case consultations and receive mentorship from clinical experts across the US. From 2017 to 2021, Indian Country ECHO has worked with over 160 clinical sites, with specific ECHOs addressing HIV, STIs, hepatitis C and gender-affirming care.<sup>102</sup>

### Public health STI research and interventions

Of the 49 citations found for public health interventions, 35 focused on youth. A majority<sup>33</sup> were targeted interventions and 20 incorporated Community-Based Participatory Research (CBPR). A multi-level approach was included in six interventions. Eleven of the interventions focused on protective factors and 10 of the interventions focused on youth empowerment for prevention. Media and technology were used as a medium of intervention in recent studies.<sup>15</sup> Two citations were reviews, one was a controlled trial, and all others<sup>30</sup> were qualitative or evaluation research.

The complex factors that influence STIs in AI/AN communities warrant novel Indigenous-centred, tribal-specific interventions. Interventions have historically lacked an ecological design and implementation that focuses on culturally relevant strength-based approaches. Nor have health promotion-disease prevention interventions with AI/AN communities addressed or leveraged the interconnectedness of the individual, family, community, and larger systems to prevent STIs.<sup>103–105</sup> Current research on Indigenous-centred intervention science recommends multi-level approaches to reduce health disparities that are: (1) multi-sectoral; (2) evidence-based and grounded in historical, contemporary, and cultural contexts; (3) sustainable with adequate financial resources; and (4) engage tribal governance in implementing trauma-informed policies and programs.<sup>105–107</sup>

To design and rigorously evaluate STI prevention and treatment interventions for AI/AN populations, intervention science research proposes further investigation in: (1) the integration of diverse cultural belief systems, ecological perspectives, and political contexts; (2) examination of how isolated communities with small populations pose limits to statistical power, external validity, and generalisability to assess scientific significance; (3) study designs that can assess fidelity, acceptability, and sustainability in AI/AN communities; and (4) utilisation of Indigenous Research Methods and mixed methods to decolonise<sup>B</sup> research.<sup>107–110</sup> Community-Based Participatory Research as a framework for partnering with Indigenous communities has been identified as a methodological bridge to address gaps in intervention science that unites local and traditional knowledge and resources of the community with the skills

<sup>B</sup>To decolonise means to identify, challenge, and revise or replace assumptions, ideas, values, and practices that reflect a coloniser's dominating influence, especially a Eurocentric dominating influence.

of researchers to enhance research relevance to improve health.<sup>111–114</sup>

Culturally relevant sexual health interventions targeting youth, tribal health educators, and other caring adults have been developed and are being evaluated.<sup>115</sup> Many interventions carry out formative research with their intended audience to guide program design, using CBPR methods to root sexual health teachings with traditional ways of learning, knowing, and sharing.<sup>116–131</sup> Robust research methods have been used to assess interventions impact and efficacy, focusing primarily on adolescents and young adults.<sup>132–135</sup> This work has generated a growing body of curricula and behavioural interventions that meet tribal, state, and federal criteria for use in school and community settings.<sup>136–146</sup>

### Innovative community solutions

Innovative community solutions to address sexual health leverage websites and mobile health (mHealth) technologies to make culturally relevant education and prevention resources accessible to AI/AN people nationwide.<sup>147,148</sup> The Healthy Native Youth website supports tribal health educators with the training and tools needed to deliver effective, age-appropriate sexual health programs.<sup>147</sup> Since its launch, the site has had >125 000 page views by educators in all 50 states. One program housed on the site, Native VOICES, is the first evidence-based intervention recognised by the Centres for Disease Control and Prevention for preventing STIs among AI/AN youth.<sup>127,149</sup>

We R Native is a holistic health resource for Native youth, by Native youth. The site includes content on healthy relationships, communication skills, pregnancy prevention, and STIs.<sup>150</sup> The service includes an interactive website, an ‘Ask Auntie’ Q-and-A service, a text message service, a YouTube channel, and social media accounts. The website has had >1.6 million page views since its inception, and sexual health topics account for nearly 30% of the site’s total viewership traffic.<sup>151</sup>

Finally, an important protective factor against early sex among AI/AN is the familial system. Interventions aimed at improving parent–child communication about sexual health have demonstrated positive outcomes among youth. *Talking is Power* is a parental text messaging intervention designed to improve parent–child communication about sexual health, pregnancy, STIs, and consent.<sup>152</sup>

### A way forward

This review identified an array of factors influencing sexual health and STI rates among AI/AN populations. Community-developed interventions have emerged but need broader implementation. Although further research is needed to address gaps in knowledge, there are sufficient data to

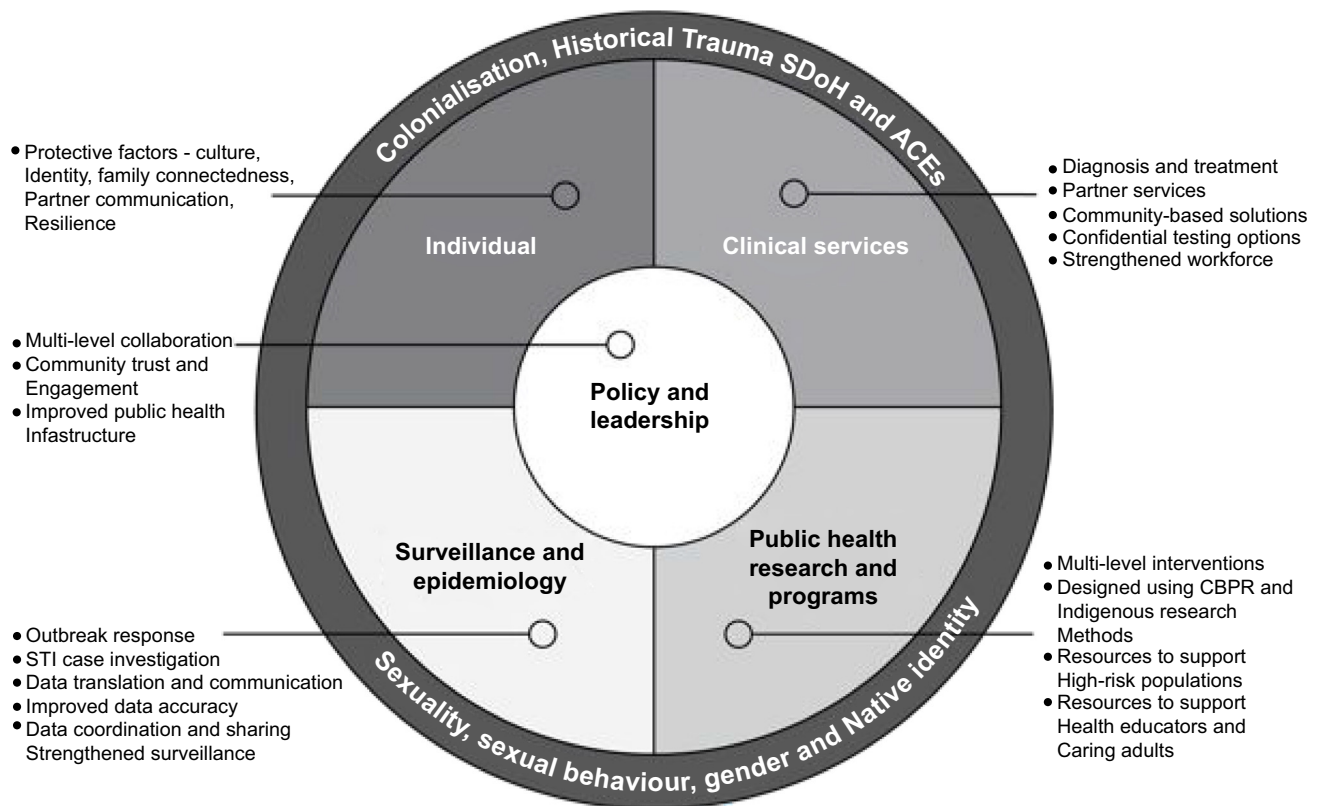
inform immediate efforts to improve surveillance, clinical care and public health interventions. Efforts to address these disparities must be based in both AI/AN cultures and public health science, engaged with and specific to each community and context. A synthesis of this review’s results and recommendations is provided in Fig. 3 as a framework for understanding and elevating sexual health among AI/AN communities.

There is a fundamental need to understand sexual health and STIs within the complexities of AI/AN-centred histories, cultures, and structural and social determinants of health. Though there is strong evidence of the importance of socioeconomic and political contexts, capacity of the health system, and behavioural and psychosocial factors, implementation of these as a framework for improving health among AI/AN has not been widely adopted into policy and practice in the US.<sup>153</sup> To do so would require strategies to address AI/AN context, multilevel and intersectoral cooperation and community participation and empowerment.

Issues surrounding social vulnerability and behavioural health have deep historical roots that will require both near-term interventions and long-term amelioration. In the near term, support of AI/AN identities, traditions, and delivery of preventive and clinical care can support comprehensive sexual health. These interventions would complement strengthening and expanding many of the sexual health and STI programs found in this review, such as access to Native-facing educational resources for communities and clinicians, and more outreach by non-clinical health workers and practitioners who are members of the community. Solutions will come not only from mainstream public health services, but also from the tapestry of traditional Indigenous practices and knowledge systems. This is the theoretical basis for Indigenous culture as a protective factor for mental, sexual, and physical health. Additional formative research is needed to design tailored prevention and care interventions that draw on these strengths.

Although epidemiological data clearly document chronically disparate STI rates among AI/AN populations relative to the general US population, gaps in reporting and racial misclassification likely underestimate the true burden. Racial misclassification must be addressed in partnership between tribal, state, and federal entities. Until such time, data for AI/AN peoples will be undercounted and inaccurate.<sup>38</sup> Enhancing data sharing between local, state and federal governmental organisations with tribes is an important step in ensuring that public health data lead to action to improve the lives of the communities and reduce disparities.<sup>154</sup>

Clinical services follow national guidelines for testing, screening, and treatment, but there is limited visibility into the ground-level delivery of STI services and barriers to care within the Indian Health System. A comprehensive analysis of type, access, and uptake of sexual health and STI services for AI/AN peoples will assist in identifying and



**Fig. 3.** A framework for understanding the context and contributors to sexual health and the prevention of sexually transmitted infections in AI/AN communities. SDoH, social determinants of health; ACEs, adverse childhood experiences.

approximating the gaps between best and current practice within these healthcare facilities. There are also notable regional differences in STI burden across tribal nations and the US that are not well understood but could inform tailored approaches to prevention. Future studies could focus on gathering regional information on healthcare access, knowledge, attitude, and practices of AI/AN communities and subgroups with respect to sexual health and STI prevention.

There is considerable potential to expand the availability of innovative tools and services to support STI response. Efforts to increase and support the clinical and public health workforce within the Indian Health System can be expanded to create an even larger network. Greater use of public health nursing, community health workers, and innovative staffing solutions can help bridge the clinical human resources gap and provide services for STIs as a standard of care. Systematic use of proven clinical interventions such as taking a sexual health history, deployment of clinical decision support tools to perform recommended screenings, and expedited partner therapy, can result in improved STI outcomes.<sup>37,76</sup> More timely diagnosis might be realised with ongoing and new availability of rapid kits for HIV and STIs,<sup>155,156</sup> and home-based testing can be a successful alternative for those in rural areas, to alleviate confidentiality and privacy concerns.<sup>99</sup>

This review has limitations. Authors acknowledge the risk of publication bias given the few numbers of publications over this 10-year period, the limited number of tribal areas involved and the few number of authors that are of AI/AN heritage. A systematic approach was taken to search peer-reviewed literature and other published sources, but gray literature was not included. Additionally, the primary focus of this special issue is non-HIV STIs; however, we included studies that integrated services for HIV, other STIs and sexual health. As improvements in STI, HIV and sexual health services are considered, an integrated approach should be the basis of providing holistic care.

At a more fundamental level, tribal leaders have long sought federal policy reform for equitable and sustainable resourcing of the Indian Health System to support the delivery of clinical services and community-led initiatives.<sup>157</sup> Achieving health equity for AI/AN people and communities can be achieved by increased resources, activities and collective action between tribal, academic, state and federal entities.

## Conclusion

Building an effective framework for sexual health and STI response for AI/AN persons requires an integrated balance



between the quadrants – of individual and community protective factors, accessible clinical services, community-driven public health interventions, and adequate public health surveillance to guide programming. Although many communities highlighted in this paper have developed innovative STI responses addressing one or two of these domains, few have had the opportunity to develop responses to all four in a multi-level socioecological manner, necessary for a public health challenge of this magnitude.

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