



Shaping Tomorrow's Nephrology: Insight-Driven Kidney Care

KSN SEOUL, KOREA
2026

The 46th Annual Meeting of the Korean Society of Nephrology



Jun 11 (Thu) – 14 (Sun), 2026

COEX, Seoul, Korea

Abstract Type : Poster exhibition

Abstract Submission No.: A-0944

Abstract Topic : Glomerular and Tubulointerstitial Disorders

Post-Infectious Glomerular Disease After Climate-Driven Sanitation Failures in Flood-Prone Settlements With C3 Depletion Hematuria Burden and Streptococcal Skin Infection Pressure as Renal Triage Signals

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Objectives : Flood-associated sanitation breakdown amplifies skin and soft-tissue infections, creating a biologically plausible pathway to post-streptococcal glomerular disease in overcrowded settlements. We tested whether a triage frame centered on streptococcal skin infection pressure, C3 depletion, and hematuria burden can identify nephritic risk early in flood-prone communities.

Methods : We built an evidence-grounded ecological-clinical synthesis using four open or publicly reported sources, a flood-outbreak review spanning 44 studies, a Canadian First Nations PSGN outbreak report, a Kashmir pediatric PSGN cohort (50 cases), and a Cape Town APSGN cohort (100 cases). The analytic plan used exposure-to-nephritis lag framing, complement-centered rule-in testing, and sensitivity analyses with skin-infection–dominant models, age stratification, competing-risk severe-fluid-overload versus dialysis need, calibration slope assessment, and a prespecified malignancy-stratified analysis that was not estimable because malignancy events were absent.

Results : Flood literature identified 121 flood-aggravated infectious diseases from 3,213 climate-linked case examples, with skin infections repeatedly intensified after sanitation failure. PSGN typically appeared 2–6 weeks after streptococcal skin infection. In Kashmir, PSGN accounted for 50 of 60 acute nephritic admissions, low C3 occurred in all cases, anti-DNase B elevation in 76%, and 94% had complete resolution by 6 months. In Cape Town, low C3 occurred in 93.5%, nearly two-thirds had preceding skin infection, and more than one-third already had pulmonary edema, heart failure, or hypertensive seizures. In the Canadian series, C3 for edema triage at ≤ 20.3 mg/dL showed sensitivity 60.9%, specificity 70.4%, positive LR 2.05, negative LR 0.56, and NPV 94.2%.

Conclusions : This triage approach is usable where biopsy and nephrology access are limited: it helps prioritize urine screening, complement testing, edema surveillance, and early referral after floods. Its main advantage is that it links climate exposure, infection burden, and renal signals using real datasets rather than speculative modeling.