We experimentally demonstrate early cancer detection system with an efficient and robust method for series connection of photonic crystal microcavities that are coupled to photonic crystal waveguides in the slow light transmission regime. We demonstrate that group index taper engineering provides excellent optical impedance matching between the input and output strip waveguides and the photonic crystal waveguide, a nearly flat transmission over the entire guided mode spectrum and clear multi-resonance peaks corresponding to individual microcavities that are connected in series. Series connected photonic crystal microcavities are further multiplexed in parallel using cascaded multimode interference power splitters to generate a high density silicon nanophotonic microarray comprising 64 photonic crystal microcavity sensors, all of which are interrogated simultaneously at the same instant of time. All the transmission spectra of PC devices with and without PC tapers were normalized to the spectrum from a reference waveguide comprising two grating couplers and one single strip waveguide. All spectra are measured in water with the objective to implement biosensing. Further results will be presented in the conference. Early cancer detection result will be presented in the conference with different biomarkers.