Supporting information

Nonvolatile Memory Based on Pentacene Organic Field-Effect Transistors with Polystyrene *para*-Substituted Oligofluorene Pendent Moieties as Polymer Electrets

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Electronic Supplementary Material (ESI) for Journal of Materials Chemistry

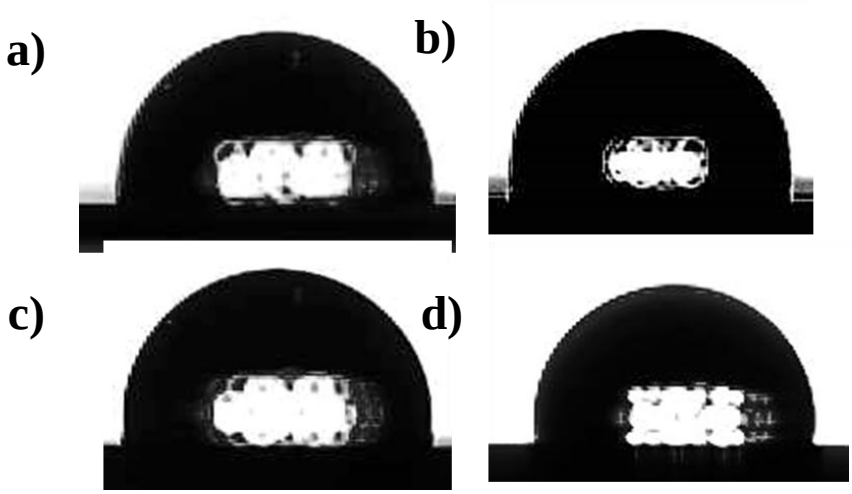

Fig. S1. Contact angles of various polymer electrets: a) PS, b) P(St-Fl), c) $P(St\text{-}Fl)_2$ d)$P(St\text{-}Fl)_3$.

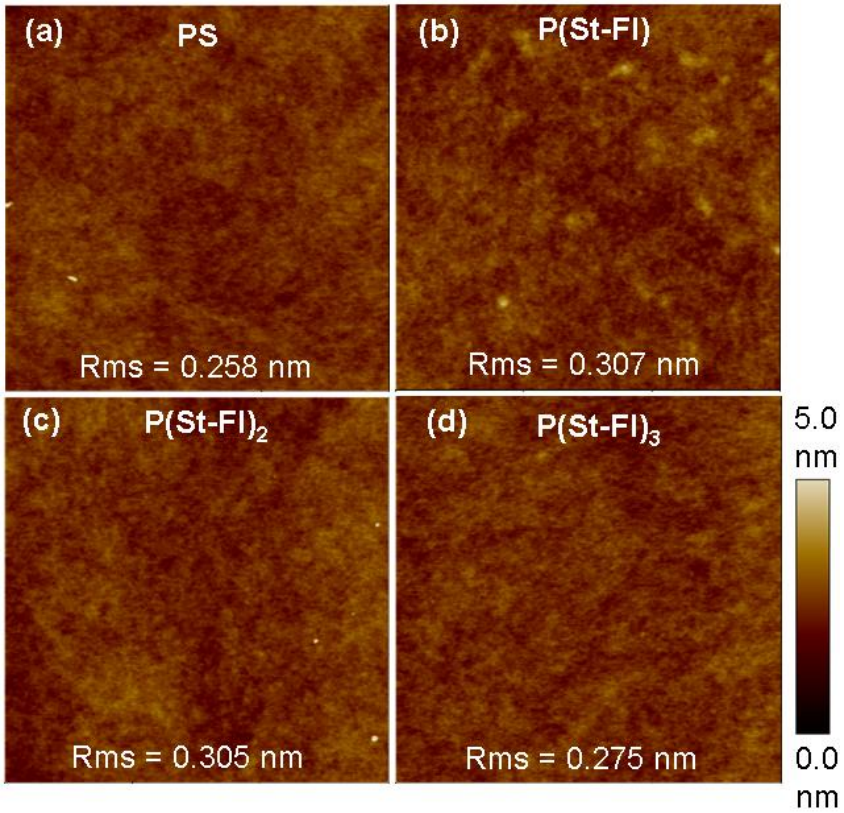

Fig. S2. Atomic force microscopy (AFM) topographies of (a) PS, (b), P(St-Fl), (c) $P(St\text{-}Fl)_2$ and (d) $P(St\text{-}Fl)_3$ spin-coated on bare SiO_2 substrates on 3μm x 3μm areas.

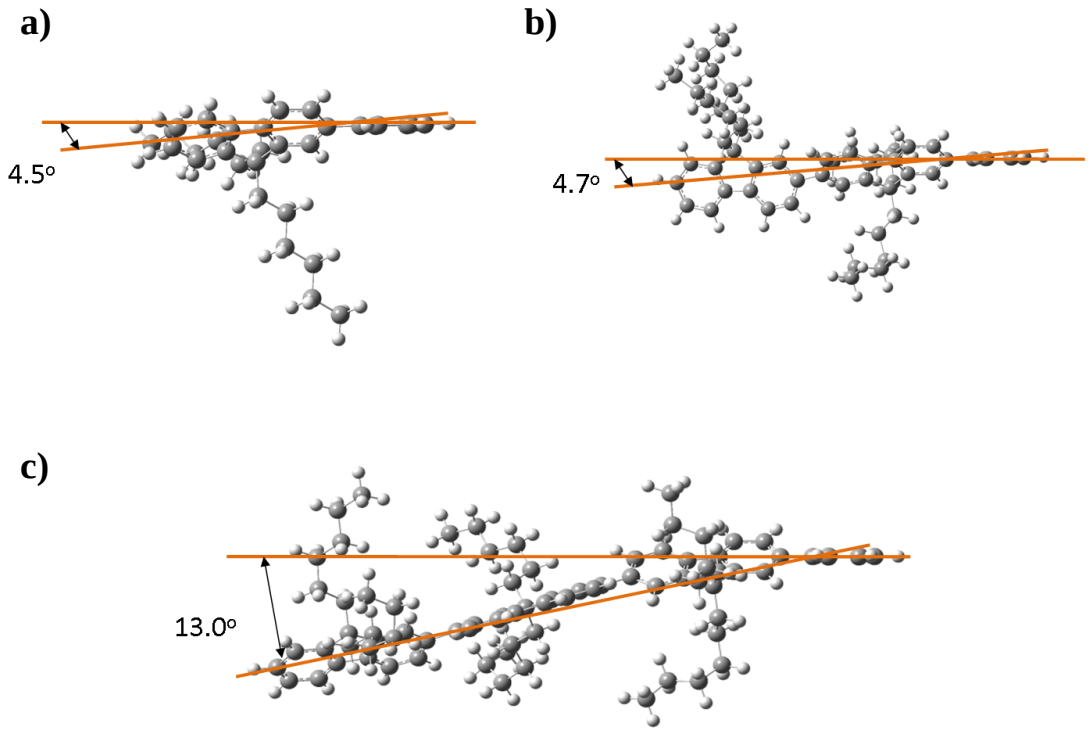

Fig. S3. Illustrated conformations of the structures with *para*-substitute a) mono-, b) di-, and c) tri- fluorene unit.

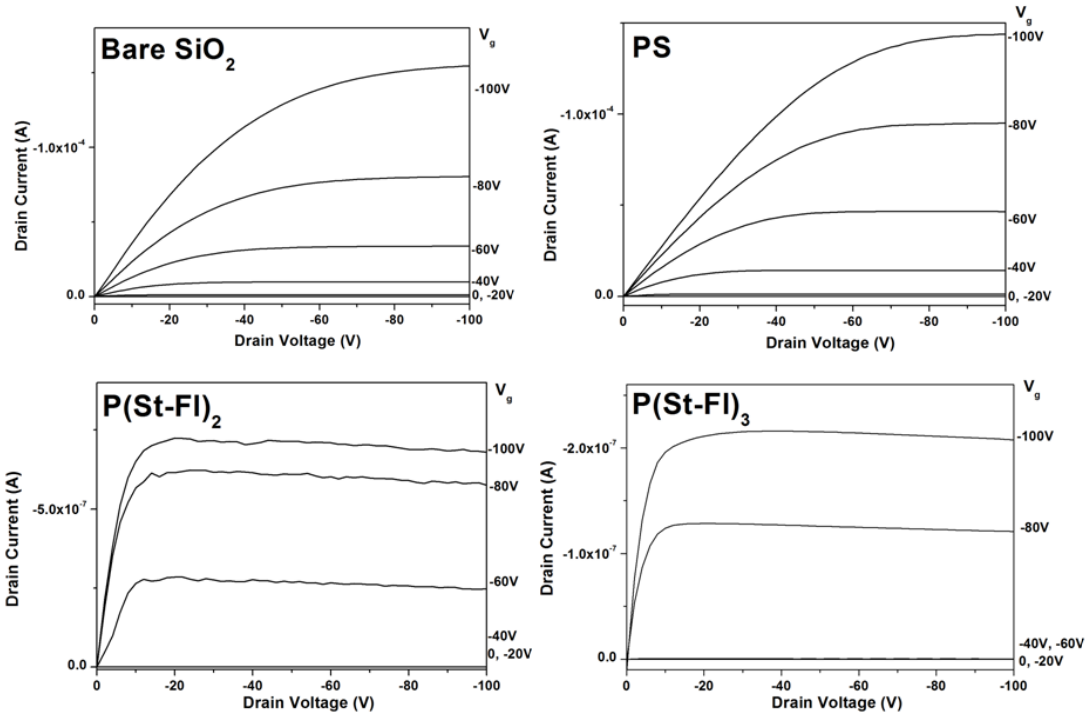

Fig. S4. Output characteristics of pentacene-based OFET memory devices.

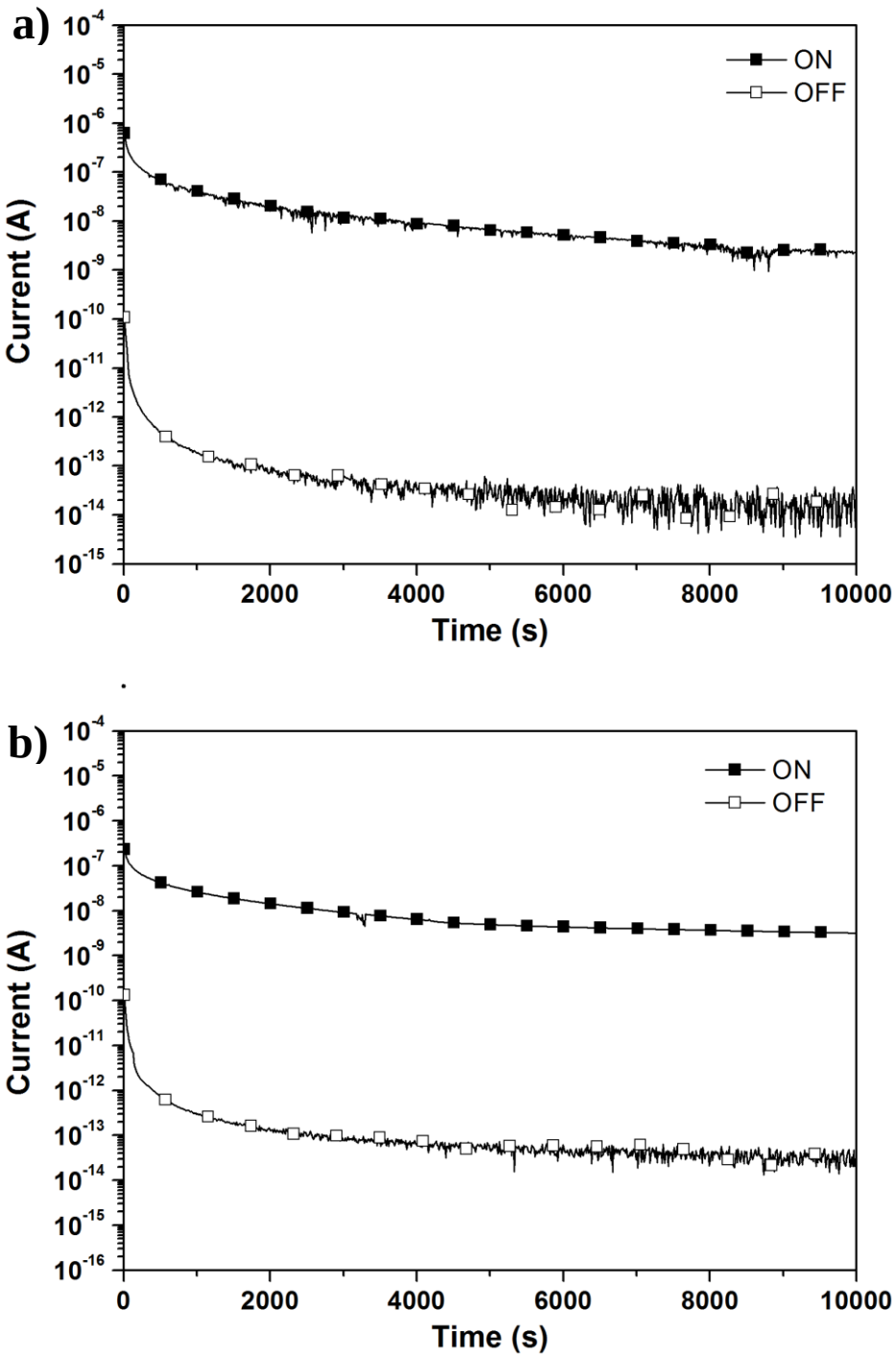

Fig. S5. Retention time of pentacene-based OFET memory device with a) $P(St\text{-}Fl)_2$ and b) $P(St\text{-}Fl)_3$ as polymer electrets, after writing and erasing process.

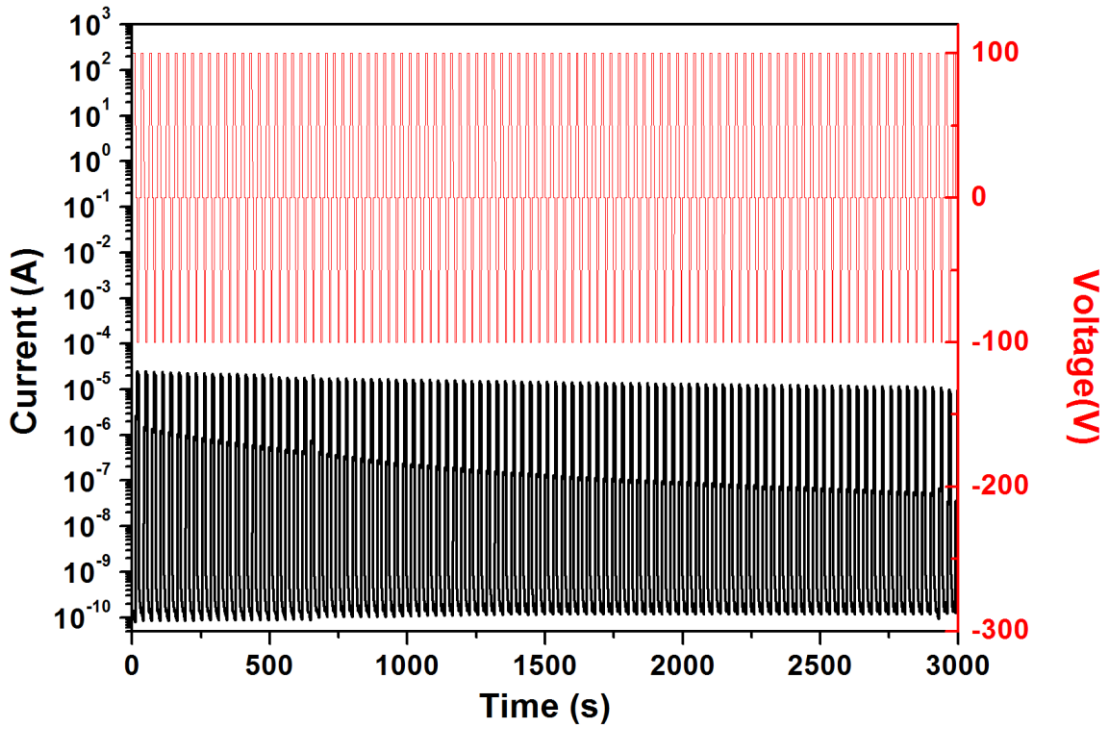

Fig. S6. Reversible switching for the ON- and OFF- states of pentacene-based OFET memory device with P(St-Fl) as polymer electret.

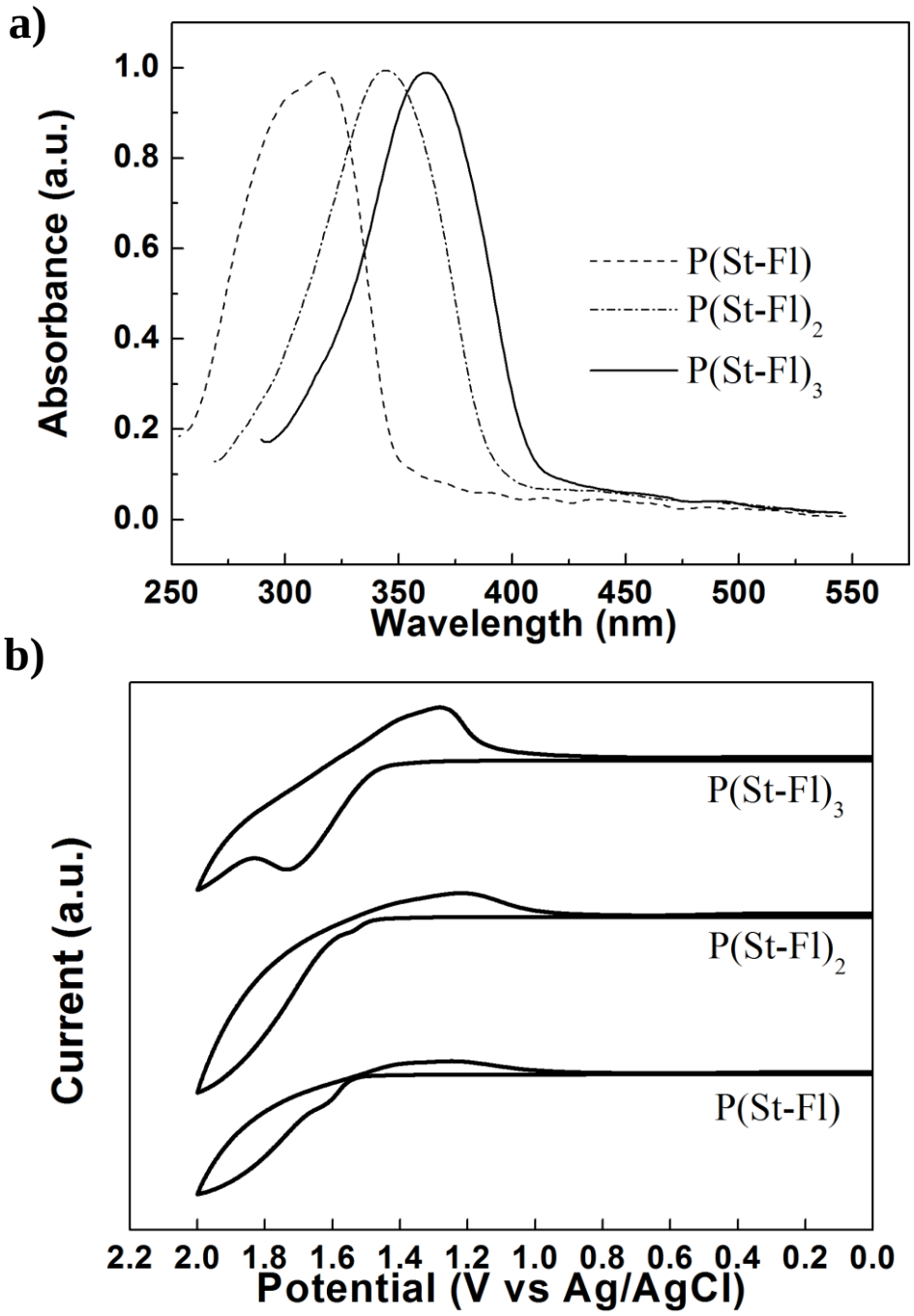

Fig.S7. a) Optical absorption spectra of the $P(St\text{-}Fl)_n$ (n=1-3) thin films. b) Cylcic voltammograms of $P(St\text{-}Fl)_n$ (n=1-3) in 0.1 M TBAP/acetonitrile solution. The HOMO energy level was determined from the onset oxidation potential (E_{onset}^{ox}) and estimated on the basis of the reference energy level of ferrocence (4.8 eV). The relation is shown by the following equations: HOMO (eV) = $-e(E_{ox}^{onset} - E_{1/2}$, ferrocene+ 4.8 eV). The LUMO energy level of was determined by the difference between HOMO level and optical band gap and estimated by the following equations: LUMO (eV) = HOMO + E_g^{opt}.

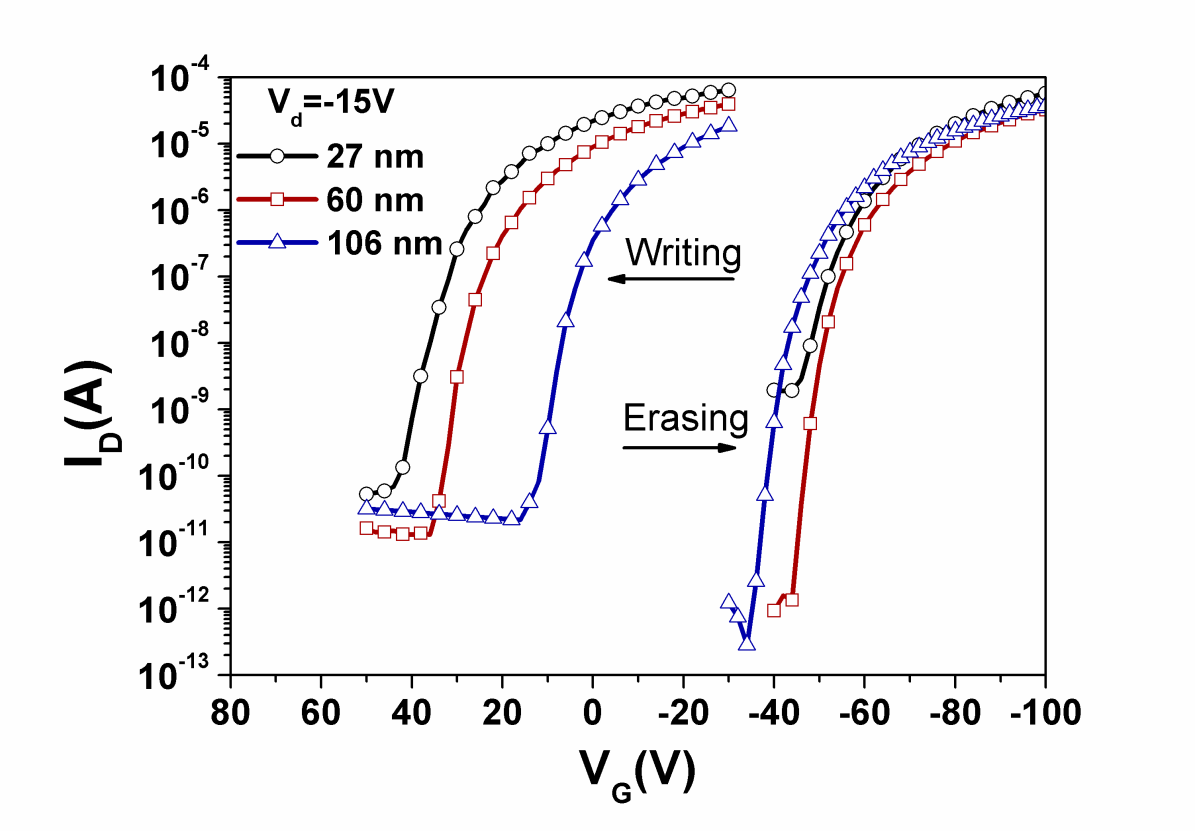

Fig. S8. Transfer curves of the pentacene-based OFET memory device based on the P(St-Fl) polymer electret using different thicknesses.