10/25/11 Used slides again → Example of Abacavir & CVD
↳ looks like Maya's slides

On randomization: $A \perp Y | W$
* this is for each indep. time point.
* we know within clusters though that obs are correlated
↳ account for this in IPTW by taking cumulative $\prod p(A_i | W_i)$

10/27/11 Recap: we discussed

$L(t) = f_{L(t)}(\bar{L}(t-1), \bar{A}(t-1), U_{L(t)})$, $t = 0, \ldots, k+1$

$A(t) = f_{A(t)}(\bar{L}(t), \bar{A}(t-1), U_{A(t)})$, $t = 0, \ldots, k$

$O = (L(0), A(0), L(1), A(1), \ldots, L(K), A(K), L(K+1))$

Can now look at $L_{\bar{a}}(t) = f_{L(t)}(\bar{L}_{\bar{a}}(t-1), \bar{a}(t-1))$
↳ would have $L(0) = L(0)$

$L_a(1) = f_{L(1)}(L(0), a(0), U_{L(1)})$

$L_a(2) = f_{L(2)}(L(0), L_a(1), a_0, a_1, U_{L(2)})$

$\vdots$

$L_a(k+1) = f_{L(k+1)}(\bar{L}_a(K), \bar{a}(K), U_{L(k+1)})$

so ⇒ $L_{\bar{a}} = (L(0), L_{\bar{a}}(1), \ldots, L_{\bar{a}}(k+1))$
↳ from this, can determine causal effect = function of prob dist of $L_{\bar{a}}$ for a collection of $\bar{a}$

example: $E(Y_{\bar{a}_1}) - E(Y_{\bar{a}_2})$

Causal effects = Parameters (functions) of counterfactual dist and U's
written as $\Psi^F(P_{U,X})$ ⇒ $\Psi^F : \mathcal{M}^F \to \mathbb{R}$

Problem: We don't observe the U's, only the $A(t)$'s and $L(t)$'s

Some literature analyzes by assigned Tx (W, R, A, Y), i.e. Principal Stratification

↳ they look at $E[Y_{R=1} - Y_{R=0} \mid A_0 = 0, A_1 = 1]$

* Requires assumptions beyond ~~or~~ RA

Another problem : .... missed it

Key Point : Mark says not good though

Wen used ex : $E[Y_{R=1} - Y_{R=0} \mid A_0 = A_1 = 1]$

$$\begin{tikzcd} & A \arrow[dr] & \\ R \arrow[ur] \arrow[rr] & & Y \end{tikzcd}$$

* would assume $R \to A$ effect $= 0$ and out estimate is a direct effect.

Batteries running low

Challenge : We might want to identify $P(\bar{L}_{\bar{a}} = \bar{\ell})$

↳ need sequential RA : $A(t) \perp\!\!\!\perp L_{\bar{a}} \mid \bar{A}(t-1), \bar{L}(t)$

Recall : $A(t) = \underbrace{f_{A(t)}(\bar{A}(t-1), \bar{L}(t), U_{A(t)})}$

conditioning on this results in only $U_{A(t)}$ being random $\mid \bar{A}(t-1), \bar{L}(t)$

i.e. $U_{A(t)} \perp U_{L(s)}$ for $s > t$ means SRA holds

↳ stronger assumption

gives you identifiability of whole dist of $L_{\bar{a}}$.

If instead, want $P(Y_{\bar{a}} = y)$,

SRA : $A(t) \perp Y_{\bar{a}} \mid \bar{A}(t-1), \bar{L}(t)$

* sufficient for seem $P(Y_{\bar{a}} = y)$

So, lets look at $P(L_{\bar{a}}(t) = \ell(t) \mid \bar{L}_{\bar{a}}(t-1) = \bar{\ell}(t-1)) \overset{SRA}{=} P(L(t) = \ell(t) \mid \bar{L}(t-1) = \bar{\ell}(t-1), \bar{A}(t-1) = \bar{a}(t$