1016-03-57 **Alex J. Wilkie***, Mathematical Institute, 24-29 St Giles, OX1 3LB Oxford, England. *Definability theory in model complete o-minimal structures with applications.*

I consider a model complete, o-minimal expansions of a real closed field by a class, F say, of infinitely differentiable functions. I also assume that F is closed under differentiation and that when we take bounded restrictions of these functions, we obtain a polynomially bounded structure. I then characterise, in a rather simple way, the pregeometry associated with the definable closure operator on this structure. As an application, bounds on (all) the derivatives of functions in F persist, at least piecewise, to all definable functions. In particular, every definable function is piecewise infinitely differentiable and, if F consists of real analytic functions, piecewise analytic (in a sense that can be made precise even if the structure is nonstandard). It also follows that every closed definable set is the zero set of some (everywhere defined) definable, infinitely differentiable function. This is all joint work with my student Gareth Jones. (Received January 24, 2006)