PREDICTING DECOMPRESSION SICKNESS RISK FROM H_2 DIVES USING CONVENTIONAL VS. BIOCHEMICAL DECOMPRESSION IN PIGS. A. Fahlman, S.R. Kayar, P. Tikuisis, W.C. Lin and W.B. Whitman. Naval Med. Res. Center, Bethesda, MD 20889; Carleton Univ., Ottawa, ON, K1S 5B6; DCIEM, Toronto, ON M3M 3B9 and Dept. Microbiology, Univ. of Georgia, Athens, GA 30602.

Biochemical decompression, the facilitation of decompression by biochemically eliminating some inert gas stored in divers' tissues, was demonstrated in pigs during simulated H_2 dives (Fahlman et al., FASEB J. 13:A408, 1999). Data were compiled to create a model of decompression sickness (DCS) risk to determine gas kinetics during decompression. To simulate a H_2 dive, pigs (n=98, 19.6±1.4 kg) were placed in a dry chamber and compressed to varying pressures (22, 24, or 26 atm) for 2.5 or 3 h. Subjects were decompressed at different rates (0.45, 0.9, or 1.8 atm/min) to 11 atm, and observed for 1 h. The DCS incidence in control animals increased with time at pressure and with increasing decompression rate. Contrary to expectations, there was no correlation between DCS and pressure. Pigs receiving intestinal injections of the H_2-metabolizing microbe, *Methanobrevibacter smithii*, had a DCS incidence that was half that of controls on a similar dive. From the complete data set, a probabilistic model will be created that will include parameters on risk assessment, gas kinetics, and H_2 metabolism. This model will allow us to predict the advantage of biochemical decompression for H_2 dives in general. (Support: ONR 603706N 0096 133 1703).