

Peter Farrell

Interview conducted by

David Caruso, PhD

June 12, 2014

SAN DIEGO TECHNOLOGY ARCHIVE



Peter Farrell



Peter Farrell is founder and chairman of the board of ResMed and has been a director and chairman of the board since its inception in June 1989. He served as chief executive officer from July 1990 until December 2007 and from February 2011 until March 2013. From March 2013 through December 2013, he served as executive chairman, and in January 2014 he became non-executive chairman.

From July 1984 to June 1989, Dr. Farrell served as vice president, research and development at various subsidiaries of Baxter Healthcare, and from August 1985 to June 1989, he also served as managing director of the Baxter Center for Medical Research. From January 1978 to December 1989, he was foundation director of the Graduate School for Biomedical Engineering at the University of New South Wales [UNSW] where he currently serves as a visiting professor and as chairman of the UNSW Centre for Innovation and Entrepreneurship.

Dr. Farrell also serves on several faculty Advisory Boards at UCSD: the Rady Business School, the Jacobs Engineering School and Health Sciences. He also serves on the Visiting Committee of the Health Sciences & Technology Program at MIT. He holds a B.E. in chemical engineering with honors from the University of Sydney, an S.M. in chemical engineering from the Massachusetts Institute of Technology, a Ph.D. in chemical and biomedical engineering from the University of Washington, Seattle and a D.Sc. from the University of New South Wales for research contributions relating to treatment with the artificial kidney.

Dr. Farrell was named 1998 San Diego Entrepreneur of the Year for Health Sciences, Australian Entrepreneur of the Year in 2001 and US National Entrepreneur of the Year for 2005 in Health Sciences. In July 2010, he was named chairman of the Executive Council of the Harvard Medical School Division of Sleep Medicine and served in that capacity until May 2013. In 2012, he joined the Board of Trustees of the Scripps Research Institute. In addition to ResMed, Dr. Farrell is a director of NuVasive, Inc., a Nasdaq-listed company which develops and markets products for the surgical treatment of spine disorders and is non-executive chair of QRxPharma, a clinical-stage specialty pharmaceutical company listed on the ASX. He is a Fellow or Honorary Fellow of several professional bodies, including the Australian Academy of Technological Sciences and Engineering, and is active in philanthropy primarily through the Farrell Family Foundation. Dr. Farrell was president of the Board of Trustees of the Museum of Contemporary Arts, San Diego (2009-2011). In 2011, Dr. Farrell was named a Gordon Fellow by UCSD's Jacobs School of Engineering and in 2012 was admitted as a member of the National Academy of Engineering.

Source: ResMed Website



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1 **Caruso:** Today is the 12th of June, 2014. I'm David Caruso here with Peter
2 Farrell in San Diego, California, as part of the San Diego Technology Archives Project.
3 Thank you again for agreeing to meet with me. As I mentioned, I wanted to start
4 talking a little bit or hearing a bit about your early life growing up. I know that you
5 received a degree in chemical engineering in Sydney. I'm assuming that you're
6 originally from Australia.

7 **Farrell:** Right.

8 **Caruso:** One thing I am curious to know a little bit about is how people wind up
9 going into engineering. Were there things that as a kid you liked – I don't know –
10 blowing things up with chemistry sets or anything like that?

11 **Farrell:** No. I guess I wasn't thinking about a career really until I was starting to
12 think, this is my last year in high school. What the hell am I going to do with my life,
13 and what am I good at? I did like mathematics very much. I enjoyed calculus, which
14 I did at high school, differential calculus. I was reasonably good at chemistry. On
15 both sides of the family, they were engineers. I was thinking about medicine just
16 because a couple of kids that I was with in high school said, "This is really what I'm
17 going to do," and they seemed committed. I thought, oh if they are that committed,
18 there must be something to it.

19 On my father's side of the family, my first cousins, who were older than I was, were
20 the two senior guys and influenced me the most. One was an aeronautical engineer
21 who graduated from Sydney University. The other was an electrical engineer, who
22 also graduated from Sydney University. My mother was very close friends with their
23 mother, so we saw a bit of them. They seemed cool guys as it were. Then on my
24 mother's side of the family, my grandfather had started an electrical engineering and

25 contracting business. A couple of my mother's siblings were actually in the business.
26 They were electrical engineering contractors, so it was engineering on both sides.

27 When I started to think about what I ought to do, I wasn't that attracted to electrical
28 engineering. With aeronautical there didn't seem to be that many jobs there.
29 Chemical [engineering] seemed to be kind of cool, but I enrolled in a general first
30 year where I could actually take the medicine or continue with chemical engineering.
31 So I did zoology and dissecting dogfish as well as pulling bits and pieces off
32 cockroaches and so forth.

33 Funnily enough, the sophomore year, I had to start cutting up dead bodies. I went to
34 the morgue and there were these sort of calico sheets over lots of bodies. I'd been
35 doing some cutting up dogfish and whatever else we cut up. I'd go home with
36 formalin on my hands, and I thought, you know what? That doesn't appeal. So I
37 went through and completed chemical engineering.

38 **Caruso:** I'm not sure how things were structured in the school system. When
39 you were taking your chemical engineering classes and other courses, was it purely
40 theoretical, or were there practical components to it? Was there an attempt to get
41 you to understand what it was to do engineering in the real world?

42 **Farrell:** Yes, but it wasn't early on. I mean there was encouragement that over
43 the summer break that you should go and get a job, but they didn't say it had to be an
44 engineering job. But, that changed in junior year. You had to actually go and work in
45 industry.

46 So I spent the summer working for Shell Oil Company between my junior and senior
47 year. One of the faculty members was there on site. I later on went to MIT, and they
48 had a chemical engineering practice school that started there many years ago and was
49 recognized as a fabulous program. It was sort of a mini, if you like, a mini practice
50 school where one of the faculty members was associated with the Shell Oil project.
51 We worked as teams and everything was focused on heat exchanger performance
52 related to a water reticulation system.

53 I found that very useful, but in the third year of the program, the junior year, we had
54 project management. We had to apply what we learned to commercial practice. It
55 was a very practical program at this point but highly theoretical in the first two years.
56 We ended up having to do some electrical engineering in the third year, and it made

57 me glad I didn't do it. *[Laughs]* I'm not against electrical engineers, but I thought,
58 good God. It wasn't just $I = E$ over R . It was detailed electronics and so forth. I just
59 didn't take to it, as it were, like a duck to water. I've got no idea how, but I actually
60 got through with high marks, but I'm still befuddled as to how that happened.

61 *[Laughs]*

62 **Caruso:** What were your plans at the end of your degree? Did you want to
63 pursue advanced degrees?

64 **Farrell:** No, I'd thought about it, and I thought, you know what? A bit of time
65 in industry is probably sensible. I was definitely going to go and work abroad. It was
66 something that I had the opportunity to do. I joined Union Carbide in Sydney and it
67 turned out that the guy running Union Carbide, Doug Freeman, was the father of a
68 guy I actually was a classmate with at the University of Sydney, Murray Freeman.
69 Murray later influenced me [to apply to grad school at MIT].

70 I joined Union Carbide, and I was working in polymers. I was interested in that area.
71 It was high density and medium density polypropylene for all sorts of applications. I
72 joined the technical service department. Union Carbide was making the resins, and
73 we'd help people when they had problems with their injection molding or anything to
74 do with molding of the [polymer]. I found that kind of interesting.

75 I was able to engineer, as it were, a transfer to the Union Carbide Canada a bit over a
76 year after I had been at the Sydney facility. It might have been closer to 18 months.
77 Anyway, I transferred to the Union Carbide labs in Montreal East, still doing
78 technical service work. I took a look around at all the guys I was working with. Most
79 of them had advanced degrees either Masters or Ph.Ds. I thought, I really ought to go
80 and get more educated if I wanted to succeed.

81 Around the same time, a lot of the textbooks we were using at Sydney University
82 were U.S.-based textbooks that were from Wisconsin, Michigan and so on but mostly
83 MIT. Unit Operations, which I think came out of Michigan and Bird, Stewart, and
84 Lightfoot out of the University of Wisconsin. They were, with MIT, the recognized
85 chemical engineering schools. There might also have been one from Stanford as well.
86 In any case, [while working in Montreal] I decided that I really ought to go and get
87 further educated. I applied to a number of schools and got a teaching fellowship to
88 MIT, [which I accepted].

89 **Caruso:** That's the practice school?

90 **Farrell:** No, I didn't do the practice school because I'd already worked in
91 industry. By that time, having worked in Sydney and Montreal, I think I'd had three
92 years under my belt. I thought, well, maybe I'm better off not going to practice
93 school. If I had it again, I probably would have gone there, but I ended up doing a
94 thesis. I'd had an operation while I was in Montreal on my kidneys. There was a
95 biomedical engineering program going on at MIT, and the guy directing it was Ed
96 Merrill. My thesis under Dr. Merrill was related to treatment with an artificial
97 kidney. I thought, artificial kidneys, God, maybe I might need that someday.
98 Hopefully not, touch wood. *[Laughs]*

99 I worked with Ed Merrill and a guy called Clark Colton, who is still on the faculty at
100 MIT. I used Clark's equipment to do membrane transport studies. I won't go into it,
101 but we got results which were difficult to reconcile. There was a guy at Columbia, Ed
102 Leonard, who was an MIT guy, and Ed was getting different results from us. One of
103 the funny things was that we were almost too good at MIT [as we had much more
104 sensitive equipment and could use much lower concentrations of solute]. We were
105 looking at sodium chloride transport, which is about the same size as urea in
106 molecular weight, urea being 60 daltons while NaCl is 58.5. We were getting much
107 higher resistance in the membranes and therefore slower transport numbers.

108 We couldn't figure out why the rate of transfer through the membranes was so slow.
109 It turned out we could use very, very low levels of sodium chloride concentration. It
110 finally turned out that the ionic distribution within the membrane actually resisted
111 the transfer of sodium chloride. When we went to higher concentrations,
112 [overwhelming the charge on the membrane], we got exactly the same results as Ed
113 and were delighted with ourselves.

114 Ed Leonard was correct, and we were so good because we used these low NaCl
115 concentrations. Yet once we overwhelmed the electrostatic charge on the
116 membranes, the transport characteristics were just based upon molecular size rather
117 than both size and electrical resistance. Anyway, I finished [my master's degree] and
118 then we decided, well, my wife wanted to go back to Sydney. We had a couple of
119 kids; one born in Montreal and one born in Boston. She said, "Oh, let's go back." I
120 said, "Okay, but on the way back, we'll just spend a year in San Francisco." I got

121 recruited by Chevron Standard Oil in California, so I went to work at Chevron in the
122 Bay Area.

123 I didn't enjoy it. Chevron is a good company, but their focus was oil, and I was
124 working in the polymer division. They just weren't serious about it, so during the
125 year I spent there, I transferred to do operations research, which was testing various
126 oil viscosities and so forth. I felt as though I was a fish out of water there. The job
127 wasn't too bad, but that wasn't what I was really long-time interested in. Out of the
128 blue, I got a job offer back in the Industrial Liaison Office at MIT.

129 I went back to interview at MIT, and Chevron wasn't very happy because I was
130 leaving after just short of one year. Anyway, I said to my wife, "Well, this could be –"
131 and she said, "Oh, no, no," but we went back to Boston. I became an industrial
132 liaison officer, which was kind of fun. Most of the guys there were MIT undergrads
133 and Harvard MBAs or the Sloan School. I think there were 12 of us and the 11 other
134 guys were looking for jobs, or they were looking to be recruited by the companies
135 they were interacting with.

136 I thought, you know what? This is not really me. I'd spent the time well, however. I
137 was meeting with guys like Paul Samuelson for lunch, which was not bad having
138 lunch with a Nobel Laureate, but I was ferrying in and looking after guys from
139 DuPont and Chevron, Texaco and so forth. I was the go between. I'd be setting up
140 meetings between people, and working on helping to compile MIT's Directory of
141 Current Research which outlined MIT's research strengths. These Companies at the
142 time, I mean this was late '60s/early 70s were paying \$50,000 a year, in uncommitted
143 dollars. I thought, you know what I think? I want to become an academic. Then I
144 thought, well know, what do I want to do and where do I go? I decided to do a PhD
145 in biomedical engineering.

146 **Caruso:** Biomedical because of your work with the kidney?

147 **Farrell:** Yes, the kidney, and that appealed to me to continue doing that stuff. I
148 can do it at MIT, but MIT was limited at that time in a clinical sense. Later on they
149 had the whole Health Sciences and Technology Program, which was a combined
150 Harvard/MIT Program. You could do a Ph.D. or other degree at MIT, and then an
151 MD at Harvard. But God, this was 15 years before that program got off the ground. It
152 was too long to wait. I didn't even know it was coming.

153 So I applied to Penn, which had a pretty good biomedical engineering school as well
154 as a good medical school. I remember the head guy, Mitchell Litt, called me. He
155 said, "No, no, [not kidneys], the project here would be to work on the rheology of
156 sputum," and I was like, *[gagging]* "Okay, thanks Mitchell." The money wasn't that
157 great. MIT offered me more or less a continuation of the scholarship, but again MIT
158 didn't have a medical school association. I also applied to the University of
159 Washington just simply because when I was doing my master's thesis, all the relevant
160 clinical work [on artificial kidneys] was coming out of UW in Seattle.

161 It turned out the two guys there that were key were Belding Scribner, who was a
162 nephrologist that UW had recruited from Stanford, and Henry Tenckhoff, who was
163 recruited, I think, from Oxford [but originally from Freiburg in Germany]. I don't
164 know whether he was the Randolph or the Churchill or whatever, but he had
165 developed the Tenckhoff Catheter while working at UW. That was how you did
166 peritoneal dialysis and Scribner had developed the Scribner shunt. UW was where
167 home dialysis started.

168 Anyway, they called me up. The guy running the bioengineering school at UW, [Les
169 Babb], called me up and he said, "What are you thinking?" I said, "Well we're living
170 in Boston, we know the joint as well as MIT, and we've got an apartment, etcetera."
171 He said, "Well, what are they offering you?" I said, "Oh, whatever it was," and he
172 said, "Okay." He said, "I've been thinking about this. Here's the deal. We'll double
173 the amount of your stipend." My GPA was a bit over 4.8 out of 5.0. He said, "All we
174 will require is for you to do one semester of courses. We expect that that should
175 mirror what you're already doing." He said, "You can spend that semester deciding
176 what the Ph.D. program would be. Then you will get advisors, one of whom would be
177 Belding Scribner. All going well, you can start your research immediately, and go
178 from there." I said, "Okay." Babb was a nuclear engineer, but he ran the biomedical
179 engineering program. He'd done a lot of work and published [with Scribner] in the
180 area of treatment with the artificial kidney.

181 We folded our tent and went to Seattle. I worked seven days a week, completed my
182 Ph.D. within about 16 months or something. Then they offered me an assistant
183 professor's job.

184 It was fantastic. I was working with Scribner mainly, but also Tenckhoff. We were
185 working with home dialysis patients on campus in what was called the Coach House.

186 My thesis involved membrane transport, modeling of the body, intra-extracellular
187 transfer, dialyzing out amino acids, and looking at nutritional requirements in
188 patients, and some binding of amino acids and so on. That was actually fun. I mean
189 working with Scribner was fantastic. We'd have these weekly meetings, in the Coach
190 House dialysis facility where the patients were being dialyzed, and we would be
191 working with real patients. It was a buzz actually.

192 It was also fun continuing to work there, but then I got recruited back to Sydney to
193 the University of New South Wales to start a biomedical engineering program there
194 which eventually developed into the Graduate School for Biomedical Engineering.

195 **Caruso:** What year were you being recruited?

196 **Farrell:** I went back there the end of '72, so this was '73 onwards, and in '78 I
197 became the foundation director of the Center for Biomedical Engineering (CBME)
198 which later became the Graduate School for Biomedical Engineering.

199 **Caruso:** Just to clarify some things, you mentioned that you wanted to be in
200 academia. You wound up working with academics who seemed to have their hand in
201 direct clinical practice. I don't know a lot about the technologies that they were
202 redeveloping, but were they commercializing those technologies or were they
203 allowing other companies to get things on the market?

204 **Farrell:** Yes. There wasn't actually translational research, as such. The idea was
205 that we should partner with somebody who is already doing this. I mean, it was
206 developing with a patient focus without a total commercial focus but there was some
207 interaction with industry.

208 But there were companies, like Baxter-Travenol, as it was then called, [now Baxter].
209 And there was a company in the area producing dialyzers and the equipment to
210 enable dialysis to take place, like the pumps and all the paraphernalia, plus the
211 dialyzer itself. [And there was PhysioControl with whom Scribner had a relationship
212 to make the shunts for patients.] Then, other than Baxter, there were other big guys,
213 Fresenius and then Gambro. We were a magnet for these dialyzer manufacturers
214 because home dialysis started at UW and we were where companies would come to
215 have their dialyzers evaluated. I was also a part of that program, which enabled me to
216 do a little bit of consulting because I wasn't being paid that much as a junior assistant
217 professor.

218 **Caruso:** What is it about the academic life that you were interested in? Since it
219 wasn't the salary – I mean professors aren't paid too well.

220 **Farrell:** I think engineering is primarily about problem-solving, whereas,
221 science tends to be universal and you just throw data out there, and people can work
222 with it, and get back to you with questions, etcetera. It was fun if they confirmed
223 your results, whereas, engineering was more technology-based to solve problems. I
224 had a good relationship with Baxter, so I had a consultancy with them. They were
225 funding research for my grad students.

226 Over the years I built up a pretty good relationship with them. I ended up spending a
227 few weeks, blocks of weeks in Chicago, in Deerfield actually. We would work on
228 problems that were highly relevant to them because that was a way to make sure that
229 they kept the funds flowing. I guess I then reached the point of waking up one
230 morning, [after running CBME for 7 years], and realizing that even if I were president
231 of the university, I just didn't care that much anymore.

232 You get to a certain level, and the system becomes highly politicized. It's all about
233 space and resources, although we talk quality, the importance of research and
234 students, and helping the students out with their careers and so on. It is in reality a
235 grab for space and a grab for resources, which were, of course, limited.

236 I'd had a little bit of a run-in with a senior UNSW [University of New South Wales]
237 administrator and I think this just happens on campuses. It depends on the campus
238 obviously and the people. It's always a people game, but I'd had a run-in with one of
239 the particular senior guys, and he seemed to go out of his way to sort of make life
240 miserable for me. Around that time, which was '84, so only 30 years ago, Baxter came
241 to me and they said, "Look we might have a job for you." I'd become close to quite a
242 few senior people in Baxter by working on problems that interested them. So they
243 came to me.

244 The president of Baxter International happened to have just been in Japan and was
245 doing a circle around the Pacific, [including Australia], and Baxter had a reasonably
246 big facility in Sydney. I also consulted for Dennis Hanley, the guy who was running
247 Baxter in Australia at the time. Dennis was an accountant, with a Harvard MBA and
248 quite smart. He had also worked for a while in Chicago. He was sent back to run
249 Australia and New Zealand. He and I got along quite well. Ironically, he's now on a
250 ResMed device, but that's [laughs] another issue. It's working extremely well for him.

251 In any case, Lawrence Kinet, who was the president then of Baxter International said,
252 "Listen, we've got some R&D projects going on in Japan. They're all over the map.
253 Nothing is being managed. We need to set up a proper R&D department there. I'd
254 like to offer you the job as vice president of R&D for Baxter Japan, and to be on the
255 Japanese board," such as it was. I mean being a subsidiary, the board didn't have a lot
256 of influence on what was going to happen. It was primarily advisory.

257 I said, "Oh, I don't know Lawrence. Let me think about it." Anyway, then a couple of
258 more—I'd call them childish—things happened at a high level within UNSW. I was
259 kind of the victim. Well, you can't be a victim without your own consent. I thought,
260 you know what? This is sounding like a bunch of crap. I called Lawrence again, and I
261 said, "Is that job still open?" He said, "Yeah." I said, "Okay, I'll take it." Well, before I
262 took it, I asked, "Now, what about remuneration? "We will pay a very competitive
263 salary with bonus and stock options and we will provide first class air fares, and a
264 car." And I thought who would want a car in Tokyo?

265 I said keep the car. *[Laughs]* Anyway, so I went back to the campus after I had the
266 job offer and I said, "I'll take a Sabbatical," and I was due a sabbatical because I hadn't
267 taken one for six years in the '70s. Then this jerk that I had a run-in with, decided to
268 cut my salary because he found out I was working primarily for a commercial entity.
269 I mean, I had an academic affiliation with Waseda University in Tokyo, one of the
270 private universities but when he found out about Baxter he said, "We'll save a bit of
271 money. We'll chop this bastard's salary." *[Laughs]* Which he did. I thought, boy, tell
272 you what? I'm just not coming back to this joint, and I never did.

273 I then became a visiting professor [at UNSW], which was good because we originally
274 set up the Baxter Center for Medical Research [BCMR] on the UNSW campus. It's a
275 very long story, we were going to put up a building up on the campus and we had
276 paid all the architectural fees, etcetera, and it fell over again because of politics.
277 [BCMR] eventually ended up going off campus, but I'm still a visiting professor there
278 after almost 30 years.

279 **Caruso:** Aren't you the chairman for the [UNSW] Center of Innovation and
280 Entrepreneurship?

281 **Farrell:** I am, I am, but that happened much, much later. That was through the
282 business school. Yes, but I mean much, much later.

283 **Caruso:** All right. This is 1984 to 1989. That's when you were in Japan?

284 **Farrell:** I lived in Japan from '84 through '85. I was there for about 18 months. I
285 then came back, but I ran Baxter's R&D in Japan for three years overall, and the
286 second 18 months I was getting up there 1 week every month. Of course, there was
287 one or two hours' difference in the time zones. You were just crossing lines of
288 latitude, not longitude, so I'd fly up on a Sunday night, fly into Narita, and get a taxi.
289 I'd get a 60-minute taxi ride, go to the hotel, have a shower, and then I'd go to a
290 board meeting. I'd work there until Friday night, and then I'd fly home Friday night,
291 and arrive home Saturday morning.

292 **Caruso:** So a couple of questions: I know in the '80s there was sort of a
293 resurgence in Japan. That's when that started coming back.

294 **Farrell:** Yes. It was a good time to work there.

295 **Caruso:** Computers are becoming more important, I think. I mean they are
296 becoming smaller and probably more involved. I'm just curious about what things
297 were like around those issues, but I'm also curious what it was like to work in Tokyo.
298 I'm assuming that English was the primary language, or did you need to converse in
299 Japanese?

300 **Farrell:** Well, I took a few lessons. There was a woman at the University of
301 Sydney whose father was a professor. She was fluent in Japanese and had spent time
302 there. In fact, she did a Ph.D. at Harvard, and I'm not sure what it was in. It wasn't
303 languages.

304 I started taking lessons. I thought, boy, this is just all too hard. I thought it was
305 actually gonna be easy [because the numbering system, 1 to 10 and on, seemed so
306 logical]. It was *ichi, ni, san, yon, go*, etcetera. Then when you get to 10, 10 was *ju*, and
307 then 11 was *ju ichi*, and then *ju ni* was 12 and I thought, wow, this is quite simple.
308 Then 20 is *ni-ju*. I thought maybe this isn't too bad. Then the only problem was that
309 when you started counting flat things and bottles and so forth, it was a completely
310 different counting system. So it turns out that it is amazingly complex.

311 I had Akiko, my assistant, although her English was quite good, speak Japanese to me
312 and I was later able to get by in restaurants and taxis and so on but never became
313 fluent. I also had about 80 Japanese guys reporting to me. And I was in Japan just a

314 week ago, and it's interesting how somebody said to me, "Well, you speak Japanese,
315 but you don't understand Japanese." And it's a bit like that. I'd have to say, "*Mou ichi*
316 *do.*" You know, "Can you repeat that?" It gets too hard for them, so they would
317 switch to English for efficient communication.

318 I wasn't at a level where I'd do business or run the risk, but I actually enjoyed it. At
319 that time, you're right, the Japanese economy was pretty damn strong. Of course, the
320 U.S. was worried about the Japanese buying up golf courses and buildings. Of course,
321 that ended up it wasn't so smart for the Japanese to have done that.

322 I should have left a lot of money there. Unfortunately, when I left, I converted
323 everything back and Japanese currency kept going up and up. I converted at the
324 wrong time. I lived in Roppongi, which of course, is the sort of night club area. It
325 was close to the U.S. Embassy. With my job there, I was a member of the Tokyo-
326 American Club. The Japanese work pretty hard, but most people don't appreciate
327 that Japanese executives don't get in the office that early. They get in about 9:00 in
328 the morning. Then the *shacho* [or President] and the *fuku shachos*—and I was a *fuku*
329 *shacho* or vice president—would for half an hour read the paper and then go into
330 meetings. But initially it is relax, take it easy, go get a coffee. But then you'd be there
331 until 9:00 at night. You'd actually go out and start eating around 9:30. It was kind of
332 a different sort of way of doing things. I actually quite enjoyed it.

333 It was difficult work. I finally said to these guys, "Look, fundamentals count. I don't
334 care. If you're in business, you're in there to sustain the business. And in order to
335 sustain the business, you've got to be making a profit. We've got to figure out how to
336 become profitable." I remember going through the fundamentals with the guys who
337 were reporting into me. I said to them, "You start with the economics and where the
338 money is going. Now, who are these consultants that bill us every month? What do
339 they do for us?" "Oh, Professor So-and-so, he's at Todai." And I would say, "Okay,
340 Tokyo University. Yes?" And I would be told that he's a very important person.

341 And I would continue, "Right, right. What's he do for us?" I mean they were all in
342 medicine like hematology and cardiology [where Baxter didn't have any relevant
343 business]. "What does he do for Baxter?" Nothing. But he is a very important [with
344 good contacts such as] with the Kōseishō or the Japanese Ministry of Health and
345 Welfare. I'd say, "Great." Anyway, I started to get rid of these consultancies. "Oh, we
346 can't do that!" They'd go to the shacho who was himself a Samurai thug, but in time,

347 I was able to get rid of all these ridiculous [consultancies]. I mean guys were going to
348 these bars [in the Ginza] and then sending their bills to Baxter. I said, "There's no
349 value in this, and we've just got to cut it."

350 Anyway, so I had some effect. They had more projects than people. I think it was
351 something like 100 projects, and they were just ridiculous little bits and pieces with a
352 few shekels here and a few shekels there. I thought, this is nuts. So I devised a
353 template as to how do we assess things that were relevant to us, and it's got to be
354 driving our business. Anyway, so I finally got down to about 25 projects, but even
355 that was too many. So I got rid of three-quarters of the projects, most of which were
356 useless to Baxter. It was a hang them down, drag them out kind of deal.

357 **Caruso:** It sounds like they had their eyes towards a lot of things, but could you
358 characterize the overall trajectory of Baxter? What was it that they were trying to
359 address?

360 **Farrell:** Well, Baxter's focus there was really two things. I mean my role was to
361 help get approval for CAPD, continuous ambulatory peritoneal dialysis, which was
362 basically putting fluid in the patient's peritoneal cavity, two liters, and you'd change
363 the fluid four times a day. It was pioneered in the U.S., and the idea was to get that
364 through the Kōseishō, the Japanese Ministry of Health and Welfare. That was the
365 main thing. The other areas were immunoglobulins and albumin, which were plasma
366 separation products. They were the two big areas.

367 Then the question was, where else should Baxter be putting stakes in the ground?
368 Let's work with people in that space. There were a couple of very good companies –
369 Asahi Medical, for one, and Takeda. Companies who were building quite good
370 hollow fiber dialyzers. Baxter had a plate dialyzer and I remember saying, "This is just
371 like an aircraft carrier when you need a cruiser." There was no way it was gonna
372 really fly in Japan.

373 Baxter eventually got into hollow fiber dialyzer, and I think I was part of that push
374 saying, "These plate dialyzers, which would be cumbersome dialyzers are just not
375 gonna be appropriate for Japan. The houses have areas which are just too small. You
376 couldn't do home dialysis."

377 **Caruso:** One thing I'm curious about, you had some involvement in clinical
378 practice or clinical trials when you were in the U.S. Clearly, in Japan, you are

379 encountering similar issues in terms of things that are gonna go into the human
380 body.

381 **Farrell:** Right.

382 **Caruso:** Was the criteria different in the two countries for what was permissible
383 or how rigorous the testing was to get devices usable on humans?

384 **Farrell:** I would say at that time, the Japanese Ministry of Health and Welfare
385 was a lot slower. No sense of urgency, but it was predictable. That would get back to
386 you in 6 months, maybe in 9 months. Pretty much you were looking at an 18 month
387 to 2 year cycle of approvals of things that you thought in the U.S. were a 6 month
388 deal. Now, it's almost the reverse.

389 I mean the U.S. has become monstrously bureaucratic, and the FDA employee view is
390 that you've got a job and if you approve something it might go wrong, so why approve
391 it? There's no real incentive to get stuff out into the marketplace. It is the rearview
392 approach and woefully outdated. The Japanese system, as cumbersome as it is, it's
393 much more predictable. You know exactly what's required. You hit the bases. You
394 get approval. It's a predictable kind of exercise; whereas, in the U.S. you can hit all
395 the bases, and then they can move the goalpost. We see that happening, particularly
396 with the current administration.

397 **Caruso:** So you spent a year and a half in Japan?

398 **Farrell:** Living there.

399 **Caruso:** Right, and then a year and a half commuting?

400 **Farrell:** Correct.

401 **Caruso:** At the end of that three-year period, what was next?

402 **Farrell:** During that time, my role was to find somebody, a Japanese guy who
403 could take over for me, and we did that. It turned out to be an internal appointment,
404 and then that internal appointment had a dotted line to me and the President
405 Komatsu, the president of Baxter Japan. He and I worked well together for a while
406 but the frequency of my visits, when the new guy was appointed, became much,
407 much less. In fact, that dotted line became so faint, that it just gradually evaporated

408 [laughs] and by 1989, I had cut bait with Baxter. I had five years with them but in the
409 remaining two years, which were '88, '89, my involvement with Japan gradually
410 tapered off.

411 I'd set up another Baxter Center for Medical research in Sydney, so the idea was to
412 look around Asia Pacific, see what low hanging fruit existed there where Baxter's
413 marketing and financial muscle could take the ideas to global markets. I had to find
414 internal receptors within Baxter, a division or somebody within Baxter, interested in
415 taking ideas and turning them into marketable products. In short, generate
416 innovation where somebody actually writes a check.

417 We were doing acute myeloid leukemia because the Fenwal Division had a plasma
418 separation device. We were also doing porcine islet cells for diabetes, mainly type 1
419 because Baxter had a diabetes group in Irvine, up the road from here. We were doing
420 kidney stuff, which was a global involvement, I mean from Guy's Hospital in London
421 [to UCSD to Penn and various others], even in Japan. Then somebody came to me
422 and said, "Look, there's this guy over at the University of Sydney Medical School. His
423 name is Colin Sullivan treating snoring sickness with a reverse vacuum cleaner."

424 I was still working for Baxter at this time, and we were looking for this low hanging
425 fruit, and I said, "Good God." I said, "This stuff sounds inane." I kind of rolled on my
426 back like a sprayed cockroach with legs up in the air, "What are you talking about?"
427 He said, "The guy seems credible; he is an MD, Ph.D. Pulmonologist who had
428 recently come back from three years working with some guru at the University of
429 Toronto," called Eliot Phillipson, who turned out to be about as highly regarded in
430 pulmonary research as Milton Friedman was in economics. And Eliot was quite anal
431 and both a capable clinician and a very solid researcher. Every data point on one of
432 his graphs would be $n = 6,000$. I mean very anal guy. [Laughs]

433 Elliot was interested in CO₂ receptors and was well known enough to write
434 occasional editorials for the *New England Journal of Medicine* and so forth. Colin had
435 trained with Eliot, and he had the concept that PAP therapy, Positive Airway Pressure
436 therapy, which had been around in hospitals for decades, could be used with just a
437 nasal mask. Everybody in critical care knew that if you slapped a mask on a patient
438 and you pressurized it at 20 centimeters of water, or thereabouts, it would move fluid
439 out of the lungs in the pleura, very effectively. And that, without diuretics, you could
440 dry a patient out pretty rapidly. Colin pondered whether or not one could do [PAP

441 therapy] with just a nasal mask. He just didn't think that the air would blow out the
442 mouth, at least not enough to depressurize the upper airway. He tried it, and it
443 worked spectacularly, in most cases. There's some patients who are inveterate mouth
444 breathers, particularly if they have a little bit of [nasal passage] distortion, such as
445 from a broken nose, or whatever, or they might need a septoplasty to open up the
446 nasal passages. Colin started this pioneering work in 1980, early 80s.

447 **Caruso:** When you say pioneering it, what do you mean?

448 **Farrell:** Well, he came up with the idea of using just a nasal mask with CPAP
449 not a full face mask as was the norm. Continuous Positive Airway Pressure had been
450 around in hospital use for ages, but this was using a nasal mask which everyone
451 thought would not work because all the air would blow out the mouth. Colin
452 patented the idea.

453 **Caruso:** Was he trying to sell it?

454 **Farrell:** No, no. But he was interested in making money from royalties. He was
455 thinking commercially. That's why he approached us, he was looking for local
456 companies, but none of the local companies were convinced that this was something
457 that made sense.

458 When I first went over to see him, he said, "I hear you're a skeptic." The guy was
459 clearly very smart. Intellectually, he got it, but the idea sounded crazy to me.
460 However, Colin came from a family with loads of good DNA. He had a brother who
461 was a professor at the University of Toronto in aeronautical engineering. He had
462 another brother who was a nuclear physicist, and so they had some reasonable DNA I
463 felt. *[Laughs]* He said to me upon meeting me, "Listen, I want you to sit in that
464 chair. I want to show you a video." It was like, "Okay. Let's go."

465 He showed me a clip of this sumo wrestler like person on his back going [imitating
466 snoring] and he had—on the video—HP tracings of blood pressure and heart rate.
467 When the guy had an obstructed apnea, oxygen levels dropped precipitately and the
468 guy's heart rate and blood pressure dropped like a stone.

469 **Caruso:** Right.

470 **Farrell:** Blood pressure dropped a little bit. *[phone ringing]* Excuse me a
471 second. *[break in audio]*

472 **Caruso:** You were mentioning the video, the sumo?

473 **Farrell:** Yeah, yeah. I watched this series of crescendo, decrescendo, blood
474 pressure, heart rate variability, and Colin said, "Do you think that's good for him?" I
475 said, "You know what? I think we can move to the next question." He said, "Look,"
476 and when he showed me the equipment, it was like an inverted toilet seat impaling
477 the guy, and if you had a leak, you'd tighten the head band and go, "Okay, how's that?
478 Still leaking? How's that?" The machine, the source of the generator of the positive
479 airway pressure is an Hitachi blower that you could run your swimming pool on it. I
480 said, "Good, God! It sounds like a freight train." He said, "Ah, yeah, well, it's a big
481 noisy, but you know, it works simply by keeping the guy's upper airway patent during
482 sleep." He said, "By the way, I should emphasize this is not a cure. It's a treatment.
483 The guy's gotta wear this every night." I said, "What?"

484 He calls his patient in, and his name was Eddie Merck. I expected a big dugong to
485 come in, and it was a guy about my body mass index, around 25 kilograms per square
486 meter. He had welts on his cheeks and a bit of necrosis at the bridge of his nose
487 where the mask was digging in. I said, "Eddie, this is a bit inconvenient." He said,
488 "Aw, yeah, a bit of Vaseline and –" I said, "Wow." I said, "The machine is so God
489 damn noisy," and he said, "Yeah, well, what I did was I moved the bed to abut the
490 garage, and I drilled a hole in the wall, and then I put the machine out with the car."

491 I again said, "Wow." He said, "Look, let me make it easy on you, Peter." He said, "Let
492 me tell you what my life was like." He said, "I'd get up in the morning. I'd sit down to
493 breakfast, and I'd fall asleep. I'd go out in the car and on my way to work I would nod
494 off at the first set of traffic lights. The guy behind me would toot to arouse me and
495 that's how I went into work. Every stop sign, every traffic light. When I'd get to
496 work, I couldn't sit down because I'd go into spontaneous rapid eye movement sleep,
497 spontaneous REM sleep, so I just couldn't sit down. I wandered around just trying to
498 keep awake. Didn't do a tap of work. I'd go home, the same way I came in, couldn't
499 go out to a movie, couldn't go out to dinner, couldn't go to an opera or anything like
500 that. Forget it. I'd fall asleep at dinner every night. Then I'd go to bed for ten hours
501 and not sleep and that was my routine. I felt like shit."

502 I said, "Oh." He said, "The first night on this machine," he said, "I was catatonic. I
503 hadn't dreamt for years. I spent the whole night in what is known as REM rebound.
504 The body was craving REM sleep. He said, "When I got up in the morning after the

505 first night." He said, "I didn't fall asleep at breakfast." He said, "I drove to work
506 without dropping off at a traffic light." He said, "And then I was able to actually do
507 some work." He said, "I would sleep on hot coals if I could get this result" I said,
508 "Oh." [He then added: "It saved my life, it saved my marriage and it saved my job."]

509 There was a guy at Baxter I worked with who I think was an Ohio State electrical
510 engineer. His name was Will Pierie, and he was on the board of American Hospital
511 Supply [AHS] before Baxter bought AHS for about \$3 billion, and it was about a one
512 to one purchase price to sales from memory. I might be wrong. The two companies
513 were merged when Baxter was doing about \$2 billion, and AHS were doing \$3 billion
514 and the combined company became Baxter. [Will came to BCMR at my request and
515 gave me some excellent advice which I'll come back to.]

516 You've now got a \$5 billion company and we just get into this fledgling thing called
517 nasal CPAP and I'm spending Baxter's money on it. I knew that it was gonna die
518 because we were developing it for a division called the Respiratory Home Care
519 Division when Baxter sold it off. I mean I read about it in the trade journal, *Clinica*.
520 Baxter would have had about 8,000 employees at the time and I guess it was in the
521 top 60 or 70 [employees in seniority] and I'm reading about what Baxter does in a
522 trade publication, and I thought, "Holy God." This idea is gonna die in its own
523 [backside within Baxter because there was no place now to park it within Baxter].

524 About the same time, my reporting relationship also changed. Lawrence Kinet who
525 had hired me, was fired. Then I was reporting to some young kid. He had an
526 undergraduate degree in industrial engineering from Cornell and also had an MBA
527 from Cornell. He'd just blown about \$60 million bucks on some sterilization activity,
528 trying to sterilize fluid going into a bag without having to steam sterilize it. It was
529 gonna save money but Baxter had to write off \$60 million. [So he got promoted.]

530 But his father, Chuck Knight, was on the board of Baxter. I didn't get along all that
531 well with Lester, and I thought, gee, I wonder how this is gonna end up? It was
532 basically a good time to leave. I said to Baxter, "Look, we'll buy the technology."
533 They said, "Okay," so back and forth it went for six months. But let me step back for a
534 moment.

535 I mentioned Will Pierie when he visited BCMR said, "Peter, let me give you a bit of
536 advice. Before you put big bucks and spend a lot of time on something, always do the
537 fatal flaw first test. Get to the boundary condition where you hope this puppy is

538 gonna work. Get there for minimal amount of money, minimal amount of time and
539 effort. Jerry-rig something, and if it works, then you put the big bucks in. Have some
540 idea of what you want out of it."

541 I'm thinking along those lines when I was talking with Colin, so after I'd finished the
542 discussion with Eddie Merck, I said, "Colin, how many people do you think suffer
543 from this?" He said, "Well, don't exactly know, but it's got to be at least 2 percent of
544 the population, and it might even cause high blood pressure." We now know in
545 spades that it does. It's the number one cause of hypertension.

546 So I'm coming from Baxter where patients with kidney disease on dialysis has a
547 prevalence of about 0.2% and we had a billion dollar business. As an MIT-educated
548 engineer, I did a couple of quick calculations. 0.2%, 2%, \$1 billion so maybe \$10
549 billion. I said, "Even if it's only \$5 billion – "so that's when I put Baxter's money into
550 it. Of course, after they sold off the rest of the Respiratory Home Care Division, we
551 had this 6 months of back and forth with lawyers and accountants, [getting
552 absolutely nowhere].

553 So I called Jim Tobin, who was then the president of Baxter, and I said, "Jim, this is
554 ridiculous. How can it take six months for something simple like this? It ought to be
555 just a chip shot." He said, "Well, what do you want to do?" I said, "Well, you guys
556 have 30 percent equity. We keep the other 70 and divvy it up." He said, "No equity."
557 I said, "Oh. Let me give that some quick thought."

558 I then said, "Okay, well, we'll give you up front half a million bucks and I was aware
559 that Baxter was always looking for a couple of extra pennies at the end of each
560 quarter. Then we'll pay you royalties of 5 percent net profit after tax for X years." He
561 said, "Okay, under one condition." I said, "What's that?" He said, "When you're next
562 through Chicago, I want you to buy me a beer." I said, "Wait a minute, are we talking
563 import or domestic?" Anyway, it was done in three weeks.

564 So it was like that. [*snaps fingers*] Tobin said, "Get this asshole out of our lives."
565 Actually, they signed a 5-year consultancy agreement with me, and then it actually
566 went on for 6. So we put our own money in and I could afford to pay myself coolie
567 wages out of ResMed. Anyway, the deal was done in late 1989 and 1990 was our first
568 fiscal year ending June 30. During that year we were approached by Medtronic, and
569 they said, "Listen, we're developing a pacemaker for the upper airway." I thought, oh
570 good luck. I'm thinking, good luck, because there are 26 sets of muscles in the upper

571 airway. Which muscles are you gonna stimulate? You don't know where the
572 problem is. It could be the velo, the oropharynx or the hypopharynx, or all of the
573 above. I thought, good luck guys. "It is going to be implantable." Well, I just
574 thought, boy, that's at least a 10-year FDA project. They said, "So, we will invest in
575 you and you guys can sell your current car battery in the U.S., but the new model we
576 want with Medtronic labeling." I said, "Yeah, that should not be a problem." They
577 put a million bucks in at a pre-money value of \$5M.

578 They said they'd like us to work with their Nortech Division. I said, "Okay, what do
579 they do?" "Trans-electrical nerve stimulation devices for treating pain management."
580 I said, "Okay." I said, "Where are they based?" "San Diego," and I said, "Where the
581 hell is that?" Now, I knew a guy, a nephrologist, Lee Henderson, at UCSD Medical
582 School, but that was it. I mean I hadn't been here.

583 Anyway, we signed the agreement with them. They ended up owning 17 percent of us.
584 Then they gave the project to this pacemaker salesman, who knew everything and
585 knew nothing, who was running Nortech, Dan Pelak. Dan turned a \$40 million
586 business making about \$4 million at the bottom line into a \$27 million business losing
587 about \$7 million. He was our partner. Imagine how well that worked out. They sold
588 almost nothing. We ended up with a million bucks worth of inventory with
589 Medtronic labels on them.

590 [When Nortech in May, 1992 were not meeting the agreed upon sales targets,] I went
591 to Fridley [MN], the Twin Cities where Medtronic is based, and met up with their
592 Executive Vice Chairman, Glen Nelson. He is an extremely nice guy who is a general
593 surgeon, Harvard undergrad, University of Minnesota, MD, but he was then working
594 full-time for Medtronic. He actually started the first HMO in the country in
595 Minnesota. Very nice guy. I said, "This is not working out, Glen," and he was the guy
596 who was pushing for it initially for the investment in us.

597 He said, "What do you want to do?" I said, "Well," I said, "I think the easiest thing is
598 we just buy back our equity." He said, "Okay." He said, "Why don't you go and get a
599 cup of coffee, come back in half an hour or so and I'll get the boys to run a few
600 numbers." Anyway, I got back and sat in his office. He goes, "Yeah, we can do
601 something. We'll sell your equity back for \$2 million." I said, "God almighty, Glen.
602 You've almost sent us broke! I mean, hell, Pelak's done absolutely nothing. The only

603 units we sold in the U.S. were the units that you guys didn't think it was appropriate
604 for Medtronic to sell." It did look like a car battery, but it worked.

605 Glen said, "Pete, your call." He then added: "Hey, whatever you want to do." I was
606 like, "Good God, this is like highway robbery." Anyway, one of the guys who had
607 already invested a million dollars, which was half equity and half loan, John Plummer
608 was his name, put in another million and we raised a million among ourselves. We
609 thought, well, it's gonna die if we don't act. Then we had the problem of what do we
610 do with all these Medtronic labeled devices? They'd messed up the marketplace for
611 us. They were going direct to the hospitals and the users. They were bypassing all
612 the DMEs and the HMEs who hated them because they thought we were just gonna
613 continue what they had done. "No, no." we said, "We want to work with you guys."

614 Anyway, we finally got through it, and although they couldn't find any business, we
615 were doubling every month from a small base, like \$10k. We'd do 10 grand and we'd
616 do 20, and then we'd do 40, and then we'd do 80, and then started to taper off a bit.
617 We were up and running from August/July of '89 [May, 1992 without the dead hand
618 of Nortech on the tiller].

619 **Caruso:** You came to San Diego. Things weren't necessarily working out. Did
620 you stay here simply because this is where the money had been originally? Is there a
621 reason you didn't just take things back to—

622 **Farrell:** Well, simply, we took six of the employees who were working on it and
623 they were living here. We basically pulled up a pick-up truck and rented a space
624 across the street. No more thought than that was given. Well, we are here. Is there
625 something we can rent around here? Yes, okay. Well, let's set up over there.

626 It turned out to be completely useless, but they [Nortech] were supplying some
627 minor stuff to us, helping out with administrative assistance and all that sort of stuff.
628 It was useless, and we finally just decided to cut bait completely because it was just
629 easier. That was it. There were half a dozen employees, and I might add one of those
630 employees is still with us. That was 1992, 22 years ago.

631 **Caruso:** It's a relatively small business. You're coming into the American
632 marketplace, which I'm assuming can't be too easy for a relatively small company.

633 **Farrell:** No.

634 **Caruso:** How did you wind up convincing people to buy what you were selling?

635 **Farrell:** Well, there were established DMEs in this space. We had a major
636 competitor that we ended up having a court case with, Philips, which was
637 Respironics. Respironics were based in Pittsburg, and they had tried to do a deal with
638 Colin Sullivan in Sydney, and they offered Colin royalties for everything outside the
639 United States, but nothing inside the United States. Well, the US was where the
640 market was, 45 [95]% of it at the time. In fact, the market is still 70 percent U.S. For
641 us, it's about 45, 55. Fifty-five is the Americas and 45 is outside.

642 They had done some groundwork, and it was treating severe apnea with an apnea
643 hypopnea index greater than 30 per hour where the sufferers are basically incapable
644 of doing anything. Just like the guy I described, there were plenty of them. We now
645 know it's 26 percent of all adults between the ages of 30 and 70 at some level. Do
646 they all need treatment? Well, it all depends. If they've got diabetes and
647 hypertension and/or hypertension or GERD or impotence or whatever, yes, they do
648 need treatment.

649 We call it the Holy Grail. It improves quality of life out of sight, [prevents co-morbid
650 disease progression and saves the sick care system money]. In fact, ironically, I had a
651 breakfast with a guy who was pitching me some deal. He said, "By the way, I have
652 one of your devices." So it's very common. I was flying out to Sydney last year, and I'm
653 sure it will happen again, the guy behind me was using a ResMed AutoSet. And flying
654 back a few days later the guy across me was using a ResMed AutoSet. I thought this is
655 just too much. And yesterday, one of the women [at ResMed] had just come back
656 from a vacation in Bali and she said, "You wouldn't believe this. There was a guy
657 there who I had just happened to meet from Sydney and when he found out I was
658 with ResMed, he said, 'Oh my God. I've got a ResMed device, and I've got it with me.'
659 He said, 'I want to tell you, I was on multiple medications to control my blood
660 pressure. I got diagnosed. I got treated, and within three days, my blood pressure
661 was normalized.'" That is not an uncommon story.

662 It improves quality of life. It stops disease progression, and in some cases actually
663 reverses it, like with heart failure and things like this. We've had patients diagnosed
664 with heart failure that have actually been declared free of it after treatment with our
665 Adaptive Servo-Ventilator. The third thing is it saves money, inpatient, outpatient
666 costs.

667 So it is the Holy Grail, and I'm just working on a white paper now to prove that where
668 we're looking, in fact, globally. There are so many anecdotes of, "Thank you for
669 saving my life." I mean I've given up collecting testimonials. I couldn't jump over
670 them. It is a marathon and we are just lacing our shoes. The best thing, [as Andy
671 Grove once said], is to get into a big space early, a big accessible marketplace.

672 Your question of how do we penetrate? There were three companies in the space.
673 There was Respiroics, Healthdyne, and ourselves. They'd done a lot of the
674 groundwork, so we initially said, "We'll target the customers that they're already
675 selling to." We had some features that were better, slightly quieter, slightly smaller,
676 that sort of thing. Then you've really got to build the market yourself. What we did
677 is we actually contracted with Respiroics, [who actually bought Healthdyne and
678 were in turn bought themselves by Philips], to get the word out.

679 There was a communications company in Boston called Schwartz Communications.
680 We were spending about \$250,000 a piece, so anything, car crashes, planes
681 overflowing airports, whatever, bullet train crashes, [there was a very high likelihood]
682 the guy's got sleep apnea. Put him on treatment, and he's fine, etcetera, etcetera. We
683 kept getting stories out into *USA Today* and the *Wall Street Journal* and all that sort
684 of stuff. We don't do it anymore because the awareness, [even on the part of primary
685 care physicians, has grown immeasurably]. There is still a great deal of ignorance,
686 but the ignorance is connecting the signs and the symptoms of untreated SDB with
687 concomitant morbidities and that this is the big problem. Physicians are treating the
688 symptoms rather than the cause. That's the big challenge now to get the word out.

689 You say, how can it take this long? If you think about it, it's like the triumvirate of
690 health, which everybody knows a little bit about nutrition, even in the failing K
691 through 12 idiocy that they have here, which they call a school system in California;
692 wrecked by the California Teachers Association. Even these poorly taught kids know
693 that it's good to have a high fiber and a low-fat diet. And people are aware that
694 physical activity is good. Physical fitness is even better, but if you don't sleep healthy,
695 and that's the other part, you can't be healthy. We spend roughly a third of our lives
696 sleeping. If your sleep is not healthy, you cannot achieve proper health. It's very,
697 very clear.

698 You say, "Well, how come it has taken so long?" People don't get observed while
699 they're sleeping by in large. They do now, but for years it was like, "We'll see you in

700 the morning." What they should have said, "See you in the morning if you get there,
701 if you make it." [Laughs] I mean that's literally the way it is. I mean literally your
702 doctor would say, "Well, listen. You get a good night's rest, and we'll see you in the
703 morning." That was it. They didn't have anybody work through the night. Nobody
704 sort of thought, "Gee, we ought to see what's happening in this guy during the night."

705 It just wasn't studied, and modern-day sleep medicine started in 1969 at Stanford.
706 That's where Bill Dement and Christian Guilleminault started with polysomnography,
707 which of course is a silly system. I mean it's a research tool that became the gold
708 standard because it put gold in the physician's pocket. That's why.

709 It's a very bad way to diagnose. You're in a foreign environment. You're not doing
710 your usual bed preparation that you do at home or the routine, if you like. You're not
711 in your own bed, so lots of people stay awake, and they get lousy results. It's the gold
712 standard and it's called the gold standard because it puts gold in the physician's
713 pocket. Nice game in the system.

714 **Caruso:** As you know, part of this project is trying to get a sense of the San
715 Diego area, and if there were things unique to San Diego that in some ways
716 contribute to the development of new companies? Were there relationships to other
717 people in the area, relationships to the university? Were there groups of
718 entrepreneurs getting together on a regular basis to chat about being entrepreneurs?
719 Was there something about San Diego that was helping to contribute to the
720 development of ResMed?

721 **Farrell:** I wouldn't say in ResMed's case it was a direct impact upon us. We are
722 here through serendipity. Medtronic happened to have a branch down here, and
723 they said, "We want you to work with these guys," and then we just, when we folded
724 up relationship or tent with them, we just, as I said, moved across the street. If you
725 look at San Diego, it's a hot bed for a life sciences. I mean you've got the Salk
726 Institute. Sir Francis Crick was there and people like Roger Guillemin. They've got a
727 couple of Nobel Laureates.

728 You've got the Scripps Research Institute; they have got umpteeny-ump members of
729 the National Academy of Sciences, probably one of the best research institutes for
730 chemistry of the human body, human biology. Then you've got the Sanford
731 Burnham. Then you've got UCSD and you've also got SDSU and USD, but the
732 research intensity at UC San Diego is obviously far, far more advanced than the other

733 two campuses. They're in La Jolla and you've got the Mesa there. You have Novartis
734 and J&J and Pfizer and so forth. You've got the big multi-nationals, if you like,
735 pharma guys who are working with the basic researchers at Salk and TSRI, and the
736 Burnham and so forth.

737 Then you've got CONNECT, which was part of the university. It was split off from
738 UCSD, but this is connecting scientists with bankers and lawyers and VCs. Then
739 you've got the CONNECT Program also administers the MIT Enterprise Forum.
740 There are quite a few opportunities to network. The Rady Business School, Ernest
741 Rady gave a fair amount of money to UCSD to start the school some years ago. It's
742 ten years old now.

743 You've got a lot of Ph.D. scientists who want to be a bit more business aware and so
744 they're taking these flex-MBAs. You've got a good quality of student within the Rady
745 School, and it's making a very good name for itself. Plus, you've got the Von Liebig
746 Center on the campus. UCSD is the biggest engineering school in California with
747 8,000 students. They've got 2,000 doctoral and masters students and 6,000
748 undergrads. It's a big school. It's a third of the campus basically is engineering.
749 Then you've got a very good medical school. I mean, very good medical school. Then
750 you've got the School of Pharmacy, and then the Shiley Eye Center. Plus, of course,
751 you've got Scripps and Sharp Hospitals, Scripps for Memorial, Scripps Green. It's a
752 critical mass. You've got 500 companies roughly of which 350 are a biotech and about
753 150 med tech.

754 **Caruso:** As ResMed started to grow, where were you getting people from? I
755 mean I assume you were increasing the number of engineers, the researchers. Where
756 were you pulling people from? Was it from the area or from other biotech places in
757 the area, or was it just word of mouth? I know you have relationships with MIT,
758 obviously with Washington.

759 **Farrell:** Yes, we have never had a problem recruiting. That is we advertise. One
760 of the easy parts is that people move here, despite the dysfunctional government we
761 have and the high taxes, they tend to say, "This is not a bad place to live," and so if
762 people lose their jobs, they don't say, "I can't wait to get back to Columbus, Ohio."
763 It's a good area to recruit because it's easy to attract people into here.

764 Even though housing is expensive, but they've got good private schools here. UCSD
765 is ranked easily in the top 20 in the world. As far as the UC system is, you've got

766 Berkeley, UCLA, and UCSD. Yes, it's right on the Mexican border. I mean it's an
767 attractive place to live even though the taxes stink and so forth. A real critical mass
768 of interaction. The MIT Enterprise Forum had a bit to do with that; very active
769 administered by CONNECT. Then you've got the head office here of Biocom.

770 **Caruso:** Just a couple of other questions. I know I've taken up a lot of your time.

771 **Farrell:** Oh, that's all right.

772 **Caruso:** Can you tell me a little bit about the San Diego Entrepreneur of the
773 Year Award that you received in 1998?

774 **Farrell:** Yes. The Ernst & Young, I mean it's a great moniker for them, the
775 Entrepreneur of the Year, and of course they've spread it worldwide. I guess I was
776 approached in 1997, early 1997. Somebody said, "You really need to have somebody
777 put in an application, etcetera." In 1997, got into the finals and disappointingly – in
778 fact, the company that won blew up later on. *[Laughs]* The next year, threw in an
779 application again and we won it. Then a couple of years later, they said, "Listen, you
780 should throw in your application." We kept executing and hitting the numbers.

781 Then in 2005, I won at the national level. Didn't win the whole thing. I think
782 somebody from Home Depot or the banks maybe. Well, Home Depot is a little
783 bigger. That was good. That was held out at Palm Desert.

784 **Caruso:** You've also been elected to the National Academy of Engineering.
785 When was that?

786 **Farrell:** 2012.

787 **Caruso:** 2012. Did you know about that in advance?

788 **Farrell:** No. You're not supposed to.

789 **Caruso:** Right. Well, you're not supposed to, but sometimes people talk.

790 **Farrell:** I mean it's not something that happens very quickly. The application
791 probably went in into 2010, but it wasn't me that put it in. In fact, it was the Dean of
792 Engineering. I was still on the Jacobs School of Engineering Advisory Board. We'd
793 taken students, biomedical engineering students, and they've got a good program at
794 UCSD. We took some kids here. Then we sent three to Sydney. I had a bit to do

795 with the dean. He said, "The National Academy of Engineering, they're trying to get
796 more non-academics," but he said, "You have been an academic."

797 There are only about 2,100 members I think. What they do is they then get a short
798 list, and they send it out to all the members. They said, "Do you think this guy is a
799 hyper-headed monster or whatever?" I think they're actively trying to recruit more
800 people from industry. I mean it's a bit of a buzz. It's not bad. The thing I like about
801 it is that it's part of the original National Academy, which Abraham Lincoln signed in
802 1863. That's kind of a buzz.

803 Although the National Academy of Engineering in Phoenix, I think that started in the
804 '60s. I believe, interestingly enough, the Institute of Medicine, which is part of the
805 National Academies – and why would you call it the Institute of Medicine, I have no
806 idea. It's now being changed to the National Academy of Medicine.

807 **Caruso:** When was the Institute of Medicine – do you know when it was
808 founded?

809 **Farrell:** I don't. I'm pretty sure it was after the National Academy of
810 Engineering. That was in the early '60s. I've got a feeling it's in the '70s. I mean I can
811 check it out on the web.

812 **Caruso:** I was just wondering, just trying to think.

813 **Farrell:** One of the members told me – I was playing golf with him, Ed Holmes,
814 who was the former dean of medicine at UCSD, who is now working for the
815 Singaporean Government; Ed told me that it was only a matter of waiting it out, that
816 they'd voted to change the name to the National Academy of Medicine, and why not?

817 **Caruso:** Yes, makes sense. I only have one or two other questions.

818 **Farrell:** Yes. Dave, I don't know how you can keep awake. *[Laughs]*

819 **Caruso:** What are the responsibilities that you have as the chairman of the
820 Center for Innovation and Entrepreneurship? Also, I know you're on the Advisory
821 Board. I think you're still on the Advisory Board for the Rady Business School as well
822 as the Jacobs Engineering School.

823 **Farrell:** Yes.

824 **Caruso:** What do you do in those capacities?

825 **Farrell:** I mean they are all nonprofits, so you do what you can, when you can. I
826 mean there will be times where Bob Sullivan, the Dean of the Rady School will say,
827 "Gee, I really need you at this meeting because Ernest is there, Ernest who wrote the
828 original check, and there are some very important strategic things we want to split off
829 from UCSD and like UCLA, the Anderson School did." I travel a lot, and can't always
830 be there. I went to the last meeting of the Jacobs Schools of Engineering. Partly,
831 these Advisory Boards are help with fundraising.

832 Also, it's a way for the deans, in particular, to get feedback from people out in the
833 community who are hiring their students, and what do you like? What don't you
834 like, etcetera? What would you like to see improved, whatever? Or, here is what
835 we're doing. Do you think we're drinking our bathwater? A lot of it is that sort of
836 thing.

837 It's very hard. Boards—probably like boards for companies—they're not meant to be
838 operational. You can't be operational. How can I pick up enough to know what the
839 hell is going on with 8,000 students and however many hundreds of staff they've got?
840 But it's strategic. You guys ought to be thinking about doing this sort of things. Why
841 don't you think about a degree in biomedical engineering where you get a combined
842 MBA, biomedical engineering degree, like an Enterprise biomedical engineering
843 Enterprise program?

844 The Center for Engineering and Entrepreneurship, I see that role, it's really how do
845 we encourage kids to get into entrepreneurial activity where innovation happens? All
846 I can do is say, "Here's where I think the elements are and occasionally give a talk
847 there." My view is very clear on this stuff. In fact, I'm giving a talk on innovation,
848 entrepreneurship, and leadership tomorrow at UCSD to the Engineering students and
849 some of the staff.

850 To me, entrepreneurship, I mean people talk about risk-taking. It's got nothing to
851 do—well, everything got to do with risk. You want to minimize it, but people don't do
852 entrepreneurial stuff because they think it's a big risk. They're doing it because it's a
853 big opportunity. They see it and you have a template and you look at it and say, "This
854 is a huge potential market, and I think we can drive it, and I think we can get there."
855 You do it because it's opportunity-seeking.

856 Innovation only occurs when somebody writes a check. If it's not anointed by the
857 economy, it doesn't exist. It can be very creative. It can be very imaginative. You
858 have to deliver the idea into the marketplace to solve a problem, a process, a product,
859 and so on. Then you've got generally a component of that, and that's why engineers
860 make really the best entrepreneurs because engineers are taught that design matters,
861 that systems are composed of parts, the parts are all interactive, and there are all sorts
862 of trade-offs. There's no perfection there. You do the best you can, and then you
863 evolve it. You don't wait to have the product with every single base covered because
864 there will be another technology coming in or another way of doing things.

865 You get it out there, and then you say, "Oh my God, yeah, that can be model two,
866 three, four, five." Then, generally, technology is the enabler for a lot of this stuff.
867 Technology, as I've said for years, it's the turbo charge of the future. It always has
868 been. It always will be. Technology invariably comes before the science. Then the
869 science comes in to say, "Oh my God, you know how that works?" Then you have the
870 technology building on the science. It keeps building on itself. Science follows, and
871 then the technology moves ahead because of the science and so forth.

872 If we apply technology to something which we already know, we call it productivity.
873 You are doing it better and smarter and so forth. If we apply technology to
874 something that's completely new and hadn't been delivered into the marketplace
875 before, it's called innovation.

876 I'm very clear on that, and so I became chairman of the Innovation and
877 Entrepreneurship Center because the dean of Engineering, whom I knew quite well,
878 an ex-McKinsey guy at the University of New South Wales asked me to give some
879 money. Then he said, "Oh, you should chair it." I said, "Well, hell, I'm living on the
880 moon compared to—" He said, "Nah, that's all right." He said, "We'll have meetings
881 when you can be here. You're back here three, four times a year." That was how it
882 started, and so they'd run the meetings. Now I've said, "That's ridiculous." In fact, I
883 ought to sit down as chairman because he ended up with some other poor mug
884 because I'd get there and I've got to sit through four hours of updates and so on and
885 so forth.

886 I guess, it's chairman by default. They're just keeping me hanging in there. They've
887 got a thing called the Farrell Prize, but that's important so the kids are competing for
888 prizes. That's why the X Prize Foundation kind of works. You have this – what do

889 they call them – big hairy unachievable goals and moonshot, private, get it up there.
890 Tens of millions of dollars get spent for a ten million dollar prize.

891 **Caruso:** Yes. People outspend the actual worth of the prize, yes.

892 **Farrell:** Oh, by a factor of ten. They end up developing all sorts of new ideas
893 and so forth. I've just recently put some money in, and I was up at some X Prize
894 thing. I was on my way to London, and ran into this guy who is an entrepreneur, a
895 true entrepreneur, Indian guy who is part of the X Prize thing. He said, "You should
896 invest in this Moon Express." I said, "Moon Express? I mean what the heck?" He
897 said, "Oh, we're gonna mine, asteroids have lots of platinum and –

898 **Caruso:** Minerals.

899 **Farrell:** –minerals and so forth. We're gonna mine the moon." I said, "Eh?"
900 Anyway, they've got a contract with NASA or something, so I said, "Okay, I'll put a
901 few shekels in." [Laughs] Then I went off and ended up a few days later on Number
902 10 Downing Street. I mean talk about funny, like right up a Terranea Resort up in
903 Palos Verdes, and then I take off to London and a couple of days later, I'm sitting with
904 Sir Martin Sorrell, WPP. Then the head of –I think, it's Keith Williams, the head of
905 British Airways, BA. Then we go on Number 10 Downing Street, and walking up the
906 stairs and all the –I met Maggie Thatcher, and I just had a lot of time for her. She was
907 a true example of leadership and its moral courage.

908 There were five things, and it was Paul Johnson who was at Oxford with her. She did
909 chemistry at Oxford, and so she had a technical background. It wasn't perfect, but
910 this guy Paul Johnson who is a historian, who graduated at the same time, and then
911 became an advisor to her. He said, "I was able to see leadership firsthand, and it was
912 Maggie Thatcher." He said, "The first thing is moral courage. You've got to do the
913 right thing, not the thing that the polls tell you is gonna be popular, etcetera, right
914 thing, and have the courage to continue to do it."

915 The second thing was judgment, which is not the same as IQ. It's being able to look
916 at a thing and say, "You know what? We don't have all the data, but this is what we
917 need to do." The third thing is selecting those things which you have to get right, like
918 if you like Vilfredo Pareto, the Italian economist, that 20 percent of the people earn
919 80 percent of the income, which became the 80/20 Rule." See, one of the things we

920 have to get right, and there's a whole bunch of things, it'd be nice if we did it, but
921 they're not critical to us doing the job we need to do.

922 The fourth thing was having the determination and the persistence that once you
923 selected those things, to finish the goddamn job.

924 The fifth thing, and you'll never be able to pick it now is ask people, say, "What's the
925 fifth thing of leadership?" I could give most people 50 shots at it, and they'd never get
926 it. Having a sense of humor. I mean isn't that true? I mean one way to put it is,
927 look, life – nobody's going to get out of life alive, so you've got to laugh at it. In a way,
928 and if you don't have a sense of humor, I mean you take everything so seriously, how
929 do you get the job done?

930 **Caruso:** *[Laughs]* I think you may have answered this, so I just have two things
931 left. One is a question about the display downstairs, and the last thing is actually just
932 sort of turning it over to you if there's anything I haven't covered that you wanted to
933 talk about, you're welcome to. I was curious to know why you have ResMed devices
934 on display downstairs. I can kind of guess at the answer to it, but I just wanted to–

935 **Farrell:** It's just really displaying how things evolve. You think you've got a
936 problem solved, and there's no way we're gonna – you've got the noise at the level
937 and the comfort. I've just talked to all these people and they just are doing so well on
938 treatment. Three years later, you look back and you say, "God, isn't it amazing. How
939 could we have –?" When the very first CPAP device – I remember we talked to some
940 researchers who were motor experts, and we said, "Listen, we need to improve this
941 thing."

942 All you're doing is taking room temperature air, and you're pressurizing it, and we'll
943 put a million patients on treatment this year. We sell basically 700,000 masks a
944 month and 200,000 devices. That's not bad.

945 We think this might be a business. We're solving problems. We're treating diabetes.
946 We're treating hypertension. We're treating GERD. It causes reflux. We're treating
947 impotence because if you don't get slow-wave sleep, you don't get testosterone
948 produced. We're treating growth in kids because if you don't get slow-wave sleep,
949 you don't get somatotropin or growth hormone produced and so on, and depression.
950 Seventy percent of major depressive disorders have sleep-disorder breathing. You
951 treat it and the depression is gone.

952 We get every single medical silo, every single one of them. Sleep—if you don't sleep
953 healthy, you cannot be healthy. It's that simple. If you have one lousy night, you feel
954 like shit. You have a lousy night every single night—

955 **Caruso:** Impossible to function.

956 **Farrell:** Bingo, and you become depressed. Dreadfully depressed. Anyway, so
957 the display. How could anybody wear this? But the very first device we had this, and
958 it was actually a metal box. People would breathe in, and so I said, "The setting is 10."
959 Ten is about the average—centimeter is like 4 inches of water, which as you'll
960 remember from your high school chemistry is 1 percent of atmospheric pressure.
961 How does it work? The bottom line is, and this is when Colin was explaining it to
962 me, this fatal flaw first test. I said, "The pressure is 10 centimeters of water?"

963 So you put it in—atmospheric pressure is about 1,000 centimeters of water. It's 1
964 percent. So the only way you can get injured by a CPAP machine is to pick the god
965 damn thing up and smash somebody over the head with it. If you're in a medical
966 business, that's not bad.

967 It's not life support, but it is. It's chronic life support. Anyway, so I remember this
968 first device you breathe in, the pressure goes to 6. You breathe out, it goes to 13.
969 We're almost blowing people's ears out.

970 Now, you cannot even measure. We go to these motor manufacturers, and they've
971 designed this beautiful motor for it, and you couldn't breathe into it or you'd blow
972 your eardrums out. It was so efficient that it had maximum resistance. It was
973 blowing all out for you. What you really wanted to do it was to have a lousy motor
974 where you could spit in it because when you're exhaling, you almost want it to suck it
975 back.

976 The swings were 6 to 7 centimeters of water and now they're about 0.2 cm of water.
977 We've designed it now where we have these terribly inefficient motors and that's
978 exactly what you want. We didn't understand it, but we've evolved the things. Now,
979 we've just released 3 brilliant masks, and we're backordered on all of them because
980 they're so much quieter, so much lighter, and so much more comfortable.

981 **Caruso:** Should we stop?

982 **Farrell:** I think, yes. [END INTERVIEW]

Recommended Citation:

Farrell, Peter. Interview conducted by David Caruso, June 12, 2014.
The San Diego Technology Archive (SDTA), UC San Diego Library, La Jolla, CA.



The San Diego Technology Archive (SDTA), an initiative of the UC San Diego Library, documents the history, formation, and evolution of the companies that formed the San Diego region's high-tech cluster, beginning in 1965. The SDTA captures the vision, strategic thinking, and recollections of key technology and business founders, entrepreneurs, academics, venture capitalists, early employees, and service providers, many of whom figured prominently in the development of San Diego's dynamic technology cluster. As these individuals articulate and comment on their contributions, innovations, and entrepreneurial trajectories, a rich living history emerges about the extraordinarily synergistic academic and commercial collaborations that distinguish the San Diego technology community.