A portrait of Len Tacconi, a middle-aged man with grey hair and glasses, wearing a dark suit, white shirt, and a patterned tie. He is smiling slightly and looking towards the camera. The background is a bright, out-of-focus interior with white architectural elements.

Len Tacconi,
global commercial
leader for mobile
health, Merck

CLASS

Mobile apps are the future of patient education and disease management, promising better tracking, improved adherence and richer patient-doctor dialogue, reports **Matthew Arnold**

Merck's Vree is a Swiss army knife of an app for type 2 diabetes patients. Launched in September for iPhone and iPad, it lets them track their blood sugar, medications, nutritional intake and activity level and to store data and create reports for discussion with their physician or diabetes educator. It is, in large measure, the future of patient education.

"The way we heard it from our customers is that managing type 2 diabetes is like managing a hundred things at a time," says Len Tacconi, global commercial leader for mobile health at Merck. "It's typically a very steep learning curve when they're first diagnosed, usually in their 50s. A lot of app developers have created single function apps in this space. They can track carbs, glucose, [blood pressure]. What we wanted to do was to create one app that did all the major things patients needed."

Say "so long" to those paper diaries and doctor-patient discussion guides that, more often than not, got lost or went neglected or were repurposed as coasters. The great thing about mobile devices—particularly smartphones—is that people never leave home without them.

"The notion was to take this ever-present device and give it added utility," says Tacconi, who mined Merck's own Januvia data, interviewed diabetes nurse educators and did rounds with a leading endocrinologist at Joslin Diabetes Center to gain insights for the app. "He said, if you're going to help them, help them—don't force them to go to five or six different places," says Tacconi. "So, we tried to cover everything, from education to weight loss to everything in between, like managing blood pressure." And instead of deluging users with volumes of information, Vree serves up content in bite-

PHOTO LEFT: SABINA LOUISE PIERCE

APPS

sized chunks appropriate to their searches.

But the really exciting thing about Vree is how it could revolutionize dialogue between patients and healthcare professionals.

“Where the magic occurs is where we can link patient use of these tools with the standard of care,” says Tacconi. “We’re providing a link between the case manager and the patient, so that you can have a personalized coaching session and say: ‘I see you’ve taken your medicine and eaten well and your glucose is still spiking, so let’s look at other ways to get that down.’ It allows you to look at the patient from a more complete perspective.”

Downloading Vree will set you back \$1.99. At that price, Merck isn’t spending a lot on the app’s launch. “We’re using this as a laboratory of customer reactions,” said Tacconi. But Merck’s motives aren’t completely altruistic—the company is conducting a trial of the app with Horizon Blue Cross Blue Shield, looking to put some numbers behind its performance, which could one day impact reimbursement. Like several of its competitors dabbling in mobile, the company can smell a potential future revenue stream there. After all, who’s better suited to the task of developing apps than drug companies that are sitting on mountains of customer insight-rich data and decades of experience with disease states?

“Down the road, it’s feasible to think that some sort of consumer electronics device, might complement or compete with a pill,” says Joe Shields, director of worldwide innovation at Pfizer. “If you could



change behavior to produce better outcomes and it could be proven clinically, there’s no reason why they couldn’t be reimbursed and actually go head to head with marginal pharmaceutical products or in combination with a pill, where compliance or monitoring is enhanced through these things.”

Chips, RFID and Bluetooth devices, Shields says, will soon be widely employed to monitor medication and generate data on everything from vitals to compliance.

“We’re starting to see this trend of the medical home,” says Shields, “where people start bringing these electronic devices in, payers start to pay for them because they’re going to reduce the number of doctor visits and hospital visits, and ultimately they’ll start to make doctor visits more meaningful, because you won’t just come in for your annual checkup and say, ‘I feel fine,’ you’ll come in with 12 months of sleep and weight data and other longitudinal things you can measure

with remote sensors.”

GoMeals, Sanofi-Aventis’s pioneering carb counter, came out with an iPad version over the summer that allows patients to graph out nutritional data like fat or caloric intake.

“If your goal is set to a certain amount of calories or fat, it tracks it for a month and then you can look at this really nice graphic of how many days you made your goal,” says Lynn Crowe, director, diabetes devices for Sanofi-Aventis. “Then you can tap that graph and look at it by day, and the physician can look at the choices you made that day. It makes this not just a tool a patient can use on the go but one that can improve patient-physician dialogue.”

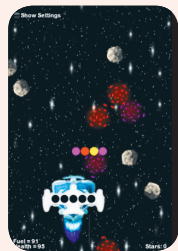
Gaming the system for better health

An Angry Birds for adherence? Not far off, says Ben Sawyer, co-founder of Games for Health and the Serious Games Initiative.

“There’s a history of games taking on complex things like learning cities,” says Sawyer. “We’re interested in the idea that games could help patients understand better what they’re doing, what’s their role in treatment, what’s the biochemistry behind it, so that they come in fully mentally prepared.”

Ben’s Game, created by an eight-year-old Leukemia patient, was a pioneer of the genre. The 2003 game, in which the player must zap all the cancer cells and collect immunological “shields” guarded by minibosses, helps kids visualize fighting cancer. A more recent addition is HopeLab’s Metroid-esque Re-Mission.

A group of researchers at Teacher’s College of Columbia University is working on a game called Lit2Quit that uses breath therapy to mimic the rush that smokers get from a puff.



“We’re combining that with research on color and sound to stimulate or relax people and also using the pace of the game to basically give people the same kinds of physiological and emotional arousal they would get from smoking,” says grad student and Lit2Quit team member Jessica Hammer, noting that a lot of smokers smoke to control their emotions.

The Lit2Quit developers are currently studying smokers’ physiological responses to the game, including heart rate and skin conductance. Next up for the Robert Wood Johnson Foundation-funded project is a field trial, and the team hopes to have a completed game by the end of the year.

The idea behind it comes out of motivational theory, says Hammer. Smokers trying to quit are stymied by short-term, pleasure-seeking “paratelic” thinking.

“Even when you’re not long-term goal oriented, when you’re playful and sensation-oriented, you might be willing to play a game,” says Hammer.

Now that’s high science.

And this stuff is in its technological infancy. One tech company that Merck consulted on Vree, Viocare, is working on using image recognition software to determine calorie counts, so that patients can simply snap a picture of their dinner plate to get an estimate of the meal's nutritional content. Another Viocare app estimates body mass index and basal metabolic rate and extrapolates from that how many calories they need in order to maintain their current weight or lose a few pounds over a period of time.

And these apps have applications beyond metabolic diseases—cardiovascular disease patients might use them to track saturated fat intake, for example, or patients with renal disease look at the potassium and protein in their diet. The trick, says Viocare president Rick Weiss, is getting users to stick with it and keep tracking their intake.

"If you want someone to use these apps long term, they're going to have to be fun," says Weiss. "If it's drudgery, even the most diligent people are going to go a week and then stop."

For brands that treat chronic conditions where adherence is a challenge, such as Bayer's Betaseron for multiple sclerosis (MS) and

"You won't just come in for your annual checkup and say, 'I feel fine,' you'll come in with 12 months of sleep and weight data"

— Joe Shields, Pfizer

Kogenate FS for hemophilia, the push notification feature offered by Apple devices has been a huge help.

"Half of all people on some chronic therapies don't take it because they forget," says Bayer customer marketing manager Cynthia North. "That's a challenge for all prescription products, but even more so when you have two products, one an infusion and one an injection, that have to be taken every other day."

When these patients go into MS or hemophilia centers, says North, they must often present diaries before they can receive a script, so Bayer had long provided paper diaries, and more recently offered text message reminders.

"While those things were very helpful and in their day were wonderful, they've become a little antiquated, because you're getting a text and then you have to go on a computer or use a paper diary to write it down. Today, it's the phone that drives our lives."

That's particularly true for Bayer's patients, for which the company designed its MyBetaApp, for MS, and FactorTracker, for hemophilia.

"Both of these communities are relatively young," says North. "On the MS side, it's primarily a women's disease, and hemophilia is a young man's disease. It's really changed the way they capture their therapies because they always have their phones."

Bayer wrestled with the question of what format to use, going with the iPhone because it was the best fit for their target demographics. But the number of different formats on the market right now and the difficulty of translating one to another is proving a barrier for many companies looking to launch apps, particularly as the Apple-Android rivalry heats up.

Of course, apps aren't the only way to deliver information to patients' phones, as Text4Baby reminded us. The free service, aimed at young, lower-income new and expecting moms, launched a year

ago, sending three messages a week with tips on pregnancy and taking care of the baby. "There's so much information about pregnancy in books and online, but there's an enormous number of women who are not getting the information they need," says Paul Meyer, president of mobile health firm Voxiva. "But they all have mobile phones and they all text like crazy, so we thought this was the right channel to reach and engage this population that needed it the most."

Fifty percent of births in America are paid for by Medicaid, says Meyer, and that's the target. The program aims to reach a million moms—about half of those—by 2012.

Over 125,000 have signed up, and the program has attracted hundreds of partners, from government agencies to non-profits to corporate sponsors.

"If you look at the infant mortality rate in the US, it's one of the highest in the developed world, much of it centered in certain parts of the country, and it's really about appropriate pre-natal care," says Sarah Colamarino, VP of corporate communications at top sponsor Johnson & Johnson. "So for us, a company that's always worked in the baby space, we were missing a pretty significant piece if we didn't worry about this part of the population that needed some extra help."

"One of the key learnings is that while this is about mobile health engagement and giving the content to these women in a format that they're comfortable with, have access to and will use, you also have to surround them with critical messaging to get them to adopt and register for the program," says Erin Byrne, chief engagement officer at ghg, which

worked on the service. That dense web of partnerships was crucial for creating that "surround sound," she added.

Of course, creating a successful mobile patient education program isn't a one-off thing. Apps require constant pruning. "We had tried to develop Vree with the notion of evergreen content," says Merck's Tacconi. "We've already issued version 2.0, and we'll have version 2.01 soon." That's no simple task when you consider the kind of rigorous review all that content must undergo.

"This is a long-term investment," says Bayer's North. "It's not like you just build it and it's done. It constantly needs to be refreshed. A lot of human and financial investment are required to launch an app and sustain it." ■

Mobile apps for diabetes and hemophilia help patients better manage their diseases

