ARROWHEAD PHARMACEUTICALS

Fiscal 2018 Third Quarter Conference Call – Prepared Remarks

August 7, 2018

1:30 PM Pacific time

Operator

Ladies and gentlemen welcome to the Arrowhead Pharmaceuticals conference call. Throughout today's recorded presentation all participants will be in a listen-only mode. After the presentation, there will be an opportunity to ask questions. I will now hand the conference call over to Vincent Anzalone, Vice President of Investor Relations for Arrowhead. Please go ahead Vince.

Vince Anzalone

Good afternoon everyone. Thank you for joining us today to discuss Arrowhead's results for its fiscal 2018 third quarter ended June 30, 2018. With us today from management are president and CEO Dr. Christopher Anzalone, who will provide an overview of the quarter; Dr. Bruce Given, our chief operating officer and head of R&D, who will discuss our clinical programs; and Ken Myszkowski, our chief financial officer, who will give a review of the financials. We will then open up the call to your questions.

Before we begin, I would like to remind you that comments made during today's call contain certain forward-looking statements within the meaning of Section 27(A) of the Securities Act of 1933 and Section 21(E) of the Securities Exchange Act of 1934. All statements other than statements of historical fact, including

without limitation those with respect to Arrowhead's goals, plans, and strategies are forward-looking statements. These include statements regarding our expectations around the development, safety and efficacy of our drug candidates, projected cash runway, and expected future development activities. These statements represent management's current expectations and are inherently uncertain. Thus, actual results may differ materially. Arrowhead disclaims any intent and undertakes no duty to update any of the forward-looking statements discussed on today's call.

You should refer to the discussions under risk factors in Arrowhead's annual report on Form 10-K and the Company's subsequent quarterly reports on Form 10-Q for additional matters to be considered in this regard, including risks and other considerations that could cause actual results to vary from the presently expected results expressed in today's call.

With that said, I'd like to turn the call over to Christopher Anzalone, President and CEO of the Company. Chris?

Chris Anzalone

Thanks Vince. Good afternoon everyone and thank you for joining us today.

Our goal with respect to our pipeline of RNAi therapeutics and the broader TRiM platform that enables it is to be best in the field. We seek to develop effective medicines; to work within timelines that others cannot; to have a validated platform that provides a level of de-risking before clinical studies even begin; to have the ability to target many cell types and therefore a wide variety of diseases; and to be the partner of choice for RNAi therapeutics. We have made important

progress on all of these fronts, and our accomplishments during the prior quarter and the period since our last conference call include the following:

1. We made multiple presentations at the EASL International Liver Congress. This included preclinical data for both ARO-AAT, our second generation candidate for the treatment of alpha-1 antitrypsin deficiency liver disease, and ARO-HBV, our third generation clinical candidate for the treatment of chronic hepatitis B virus infection, and additional clinical data on ARC-520, our prior generation compound for HBV
2. We presented preclinical data on our growing pipeline at several medical meetings, including data on our cardiometabolic candidates ARO-APOC3 and ARO-ANG3 and our first candidate targeting the lung, ARO-ENaC
3. We completed enrollment and dosing of the single ascending dose portion of the ongoing Phase 1/2 study of ARO-HBV and began dosing HBV patients in the multiple ascending dose portion of the study
4. We completed enrollment of the Phase 1 study of ARO-AAT
5. We received a positive EMA opinion on orphan designation for ARO-AAT, this follows orphan drug designation that was previously granted by the US FDA
6. We presented early clinical data on ARO-AAT at the Alpha-1 National Education Conference. This was the first clinical data presented on our TRiM™ platform
7. And most recently, we announced that Amgen had administered the first doses of AMG 890 in a Phase 1 clinical study, which earned us a $10 million milestone payment

We have continued to execute at a high level, and we feel well positioned for some key events during the second half of this year and into 2019.

Let's drill down on a few of the events during the quarter.

Last week we announced that we earned a $10 million milestone from Amgen following the administration of the first dose of AMG 890, formerly referred to as ARO-LPA, in a clinical study. Amgen is evaluating AMG 890 in a Phase 1 study in approximately 90 subjects to assess safety, tolerability, pharmacokinetics and pharmacodynamic effects. The study will be performed in two phases: a single ascending dose phase and a multiple ascending dose phase in subjects with elevated Lp(a). The estimated primary completion date of the Phase 1 study is in the second half of 2019. Following the primary completion, Amgen will share the data in the appropriate scientific forums.

AMG 890 is the third drug candidate enabled by TRiM™ to enter clinical development this year, following ARO-AAT and ARO-HBV. We view this step, and our collaboration with Amgen generally, as further validation of our proprietary TRiM™ platform.

Under the terms of the two cardiovascular agreements with Amgen announced in September 2016, Arrowhead is eligible to receive up to $617 million in option payments and development, regulatory and sales milestone payments. Arrowhead is further eligible to receive up to low double-digit royalties for sales of products under the AMG 890 agreement and single-digit royalties for sales of products against an undisclosed target.

In addition to the progress on this partnered program, we continue to advance our wholly-owned candidates ARO-HBV and ARO-AAT through first-in-human studies very rapidly. Bruce will give specific details in a moment about where we

are in each study, but I want to talk briefly about our strategy, execution, and early evidence of activity and tolerability.

Both the ARO-HBV and ARO-AAT studies include a single-ascending dose phase and a multiple-ascending dose phase that are intended to rapidly get to meaningful readouts on safety and tolerability as well as a robust view of the drugs' activity. For RNAi drugs in general and for our TRiM™ enabled drugs specifically, the duration of effect can be quite long. It's conceivable that in humans we may see 60 or even 90 days of duration. So, in the cohorts of our first-in-human studies that are receiving three monthly doses, we may see activity that lasts as long as 6 months. It is rare to generate that much meaningful data in a first-in-human study.

So how are the studies progressing? We believe our execution has been best-in-class. Both studies started in March, and by the middle of May we were well in to the SAD portion of the ARO-HBV study and began dosing HBV patients in the MAD portion. Then at the end of May, we completed enrollment and dosing of the entire SAD portion of the study in healthy volunteers. Two weeks later in the middle of June, we announced that we had completed enrollment in both the SAD and MAD portions of the ARO-AAT study.

I want to thank our program management and clinical operations groups, who continue to work tirelessly to maintain this pace. I would also like to acknowledge the clinical investigators who have been equally motivated and extremely successful at enrolling these studies. Our long standing relationships and experience from studies of prior generation compounds makes the process quite reliable and, to date, has yielded highly streamlined studies.

So what do the data look like so far? We presented a quick snapshot of some initial clinical data from the ARO-AAT study at an Alpha-1 patient meeting at the end of June, and the data were very encouraging. At a somewhat low dose of 100 mg, which equates to between 1.0 and 1.6 mg/kg in the subjects studied, we achieved a maximum serum AAT knockdown of 93% and a mean maximum knockdown of 87% after a single dose. Based on our experience in primates and prior human clinical studies, we believe this represents near complete suppression of the liver production of AAT. In addition, at 8 weeks post-dose, the mean serum AAT knockdown remained at 83%. ARO-AAT has been generally well tolerated at all dose levels studied, with no serious or severe adverse events.

These are great data, and we are excited to see what the rest of the study looks like. Importantly, these are very encouraging for the Alpha-1 community that has no treatment options for serious liver disease associated with alpha-1 antitrypsin deficiency, short of liver transplant.

We have not presented any data from the ARO-HBV study, but to date 63 subjects have received at least 1 dose. 30 healthy volunteers and 33 patients with chronic HBV infection have received a total of 104 injections of ARO-HBV. It has been generally well tolerated at all dose levels studied, with no serious or severe adverse events. In addition, early data in patients indicate that the drug is clearly active. Importantly, we believe these data suggest that ARO-HBV is active in silencing s-antigen production from both HBV cccDNA and viral DNA that has integrated into host DNA. This would represent a large step forward from our first generation candidate, ARC-520, which did not address s-antigen transcripts from integrated DNA.

Our plan is to submit late-breaker abstracts for ARO-AAT and ARO-HBV and, if accepted, to present at the AASLD Liver Meeting in November. As I mentioned, the studies are moving forward rapidly, so we should have robust datasets at that time.

During the last quarter we presented some clinical data on our prior generation HBV compound, ARC-520, at the EASL International Liver Congress. These data included follow up for 8 patients that received up to 9 monthly doses of 4 mg/kg ARC-520 with daily entecavir in the Heparc-2001 multi-dose extension study. As I mentioned, a key limitation of this candidate was that it only targeted HBV cccDNA and did not address s-antigen transcribed from integrated DNA. We discovered that this can be a substantial source, and sometimes the primary source, of circulating s-antigen. Even so, half of these patients experienced a sustained host response, where it appears that ARC-520 triggered something that enabled the body to fight the virus. This was the intended mode of action for ARC-520 and is the intended mode of action for ARO-HBV. It has been our theory that if an RNAi therapeutic can reduce viral antigens sufficiently and decrease immunosuppressive forces, the immune system may "re-awaken" to control the virus and enable a durable functional cure. One e-antigen negative patient that received ARC-520 treatment, while remaining on entecavir, serocleared for all measurable viral markers including s-antigen, core-related antigen, HBV RNA, and HBV DNA. We believe this will represent a functional cure. Two additional patients that experienced sustained host responses but had not yet serocleared, appeared poised to potentially seroclear if the trends in the decrease of viral markers continues.

We, and many key opinion leaders in HBV, see these data as the first proof-of-concept that an RNAi compound can potentially lead to an awakening of the immune system in HBV patients and eventual functional cure. This has long been

our belief, and it is highly encouraging that our previous generation HBV candidate has provided what we think is the first clinical evidence supporting it. This gives us additional confidence in ARO-HBV as we move forward with the Phase 1/2 this year and then a planned Phase 2b study next year.

With our clinical programs progressing well, our confidence in the broader pipeline grows. We have several candidates that we expect to enter the clinic over the next 18 months, so it makes sense for us to have a broad R&D day to discuss these candidates, our rationale for pursuing them, and our anticipated clinical timelines. I am pleased to announce our plan to host an R&D day on October 16 in New York. The event will be open to analysts and institutional investors by invitation, and there will also be a live webcast so those unable to attend in person can view the presentations.

Included in the R&D day presentation will be ARO-APOC3 and ARO-ANG3, our most advanced wholly-owned preclinical candidates. They are targeting apolipoprotein C-III, or apoC-III, and angiopoietin-like protein 3, or ANGPTL3, respectively. They are designed to address multiple cardiometabolic diseases and may offer various development paths targeting both mass market and/or orphan indications. These candidates are moving ahead according to plan and we continue to be excited about the opportunities that they represent. We are on schedule to file CTAs for both candidates around the end of the year.

Our ability to efficiently target solid tumors has grown substantially over the past year, so we will discuss this in some depth.

We will also present data on ARO-ENaC, our first inhaled, lung-targeted candidate for the treatment of cystic fibrosis. We have been presenting select data on this

candidate at various medical meetings throughout 2018. We have made great strides recently in optimizing the TRiM™ based pulmonary delivery platform, which has led to a greater than two-fold improvement in potency over our prior recent constructs and solid improvements in the safety profile. In addition, we have started using newer ligands that have distinct advantages and have discovered ways to eliminate the use of PK enhancing structures, which makes for a smaller and more structurally simple molecule.

Because of these improvements, the ARO-ENaC CTA is being pushed into 2019 to allow more time to fully optimize the compound. We view the pulmonary programs as substantial value drivers over the long-term, so we are being a bit less aggressive on the timeframe to the clinic for the first product and focusing more on identifying the optimal structures. Our goal is to ensure that we move forward with the best drug possible, and our recent advancements have dramatically improved the next generation of ARO-ENaC.

With that overview, I'd now like to turn the call over to Bruce Given, our COO and head of R&D. Bruce?

Bruce Given

Thank you Chris and good afternoon everyone.

On our last quarterly call, I described the design of our two clinical studies for ARO-AAT and ARO-HBV. They both continue to move forward rapidly. To review, for both studies the primary outcome measures are safety and tolerability. For ARO-AAT, secondary outcome measures include pharmacokinetics, percent change in serum alpha-1 antitrypsin levels, and duration of response. For ARO-

HBV, secondary outcome measures include pharmacokinetics, and an assessment of the change in all measurable viral markers, including s-antigen, DNA, RNA, e-antigen, and core-related antigen.

I thought it would be helpful today to go through a review of specifically where we are with each study and what data may be available for the AASLD late-breaker abstract submission deadline in September and then what data may be available to present at the meeting in November, should our abstracts be accepted.

Let's start with ARO-AAT. The Phase 1 study, called AROAAT1001, started enrolling and dosing subjects around the middle of March. In the middle of June, we announced that the study had been fully enrolled and all subjects had received at least their first dose. We also announced at that time that two planned cohorts at a dose of 400 mg were eliminated because maximal activity appeared to occur at lower doses than expected.

So where are we today? 45 subjects have been enrolled and dosed across all cohorts, with 20 in the single dose cohorts and 25 in the multiple dose cohorts.

The single dose cohorts, at doses of 35, 100, 200, and 300 mg, will have as much as 6 months of follow up for the earliest cohort and approximately 3 months of follow-up for the last cohort at the time of the late-breaker deadline. By the November meeting there will be approximately 5 to 8 months of follow up for the single dose cohorts.

We are scheduled to complete the third and final dose for the final subject in the multiple dose portion of AROAAT1001 over the next 10 days. The earliest multiple dose cohort received the final dose during the second week of June. So,

by the late breaker deadline we will have up to 3 months of follow-up for the earliest cohort and 1 month of follow-up for the last subject. By the November meeting there will be approximately 3 to 5 months of follow-up for the multiple dose cohorts.

We anticipate, based on the data that we presented for the 100 mg cohort at the Alpha-1 patient meeting, that 3 months may not be long enough to see a full recovery of serum AAT back to baseline levels, so there will likely still be additional follow up needed. However, this will be a helpful dataset and should show what peak knockdown levels are and what the duration of effect and recovery curves look like for the different dose levels. This will help to inform our decision about what dose level or levels to select for the Phase 2 study and what the dosing interval should be.

Moving on to ARO-HBV and the Phase 1/2 study, called AROHBV1001. 63 subjects have been enrolled and dosed across all cohorts, with 30 healthy volunteers in the single dose portion and 33 chronic HBV patients in the multiple dose portion.

The single dose portion of the study completed dosing at the end of May, so we will have a full dataset on safety and tolerability for that group in time for the late-breaker deadline.

The multiple dose portion of the study is a little more complicated, because we have cohorts that are open to all comers, cohorts that are specific to e-antigen status, and cohorts for NUC treatment experienced versus not on NUC treatment. While most cohorts receive 3 monthly doses., we are also investigating bi-weekly, and weekly loading dose schedules.

Designed to explore dose response, three of the four monthly dosing interval, all comers cohorts, at doses of 100, 200, and 300 mg, have already received their third and final dose and the fourth cohort at a 400 mg dose is scheduled to receive the final dose over the next 10 days.

We anticipate that all remaining subjects in the other cohorts will have received all doses by mid to late September. By the November meeting, we anticipate that data showing multi-month post-dose levels of s-antigen, e-antigen and HBV DNA, where applicable, should be available for all cohorts. In addition, multi-dose HBV RNA and core-related antigen data, where measurable, should also be available for all cohorts.

Similar to ARO-AAT, we will not have data for all the final study visits for all patients, so there will still be additional follow-up and data collection after November. This is, however, an impressive amount of data for a first-in-human study and we look forward to giving the highly anticipated first readout for ARO-HBV, should our abstract be accepted at AASLD.

With that brief review of our clinical programs, I'd like to turn the call over to Ken Myszkowski, Arrowhead's Chief Financial Officer. Ken?

Ken Myszkowski

Thank you Bruce, and good afternoon everyone.

As we reported today, our net loss for the quarter ended June 30, 2018 was $15.6 million, or $0.18 per share based on 87.6 million weighted average shares

outstanding. This compares with a net loss of $5.5 million, or $0.07 per share based on 74.8 million weighted average shares outstanding, for the quarter ended June 30, 2017.

Revenue for the quarter ended June 30, 2018 was $0.7 million, compared to $9.3 million for the quarter ended June 30, 2017. Revenue was lower because revenue from the $30 million upfront payment received from Amgen for the ARO-LPA (AMG 890) agreement was fully recognized in October 2017. Revenue in the current period primarily relates to the recognition of a portion of the $5 million upfront payment received from Amgen for the ARO-AMG1 agreement. Of the total upfront payments of $35 million, all but $0.6 million has been recognized as revenue to date, and the remainder is anticipated to be recognized in the next quarter.

Total operating expenses for the quarter ended June 30, 2018 were $16.6 million, compared to $15.1 million for the quarter ended June 30, 2017. This increase is primarily due to toxicity study costs for our ARO-AAT and ARO-HBV candidates.

Net cash used by operating activities during the quarter ended June 30, 2018 was $14.4 million, compared with net cash used by operating activities of $10.4 million during the quarter ended June 30, 2017. This increase was due to the progression of our ARO-AAT and ARO-HBV candidates into phase 1 clinical studies as well as for manufacturing payments related to our other candidates.

Turning to our balance sheet, our cash and investments totaled $78.2 million at June 30, 2018, compared to $65.6 million at September 30, 2017.

Our common shares outstanding at June 30, 2018, were 87.9 million.

With that brief overview, I will now turn the call back to Chris.

Chris Anzalone

Thanks Ken.

At the outset of the call, I said that our goal for our drug candidates and underlying platform is to be the best in the field. I mentioned several parameters that we are focused on within this goal, and we have clear evidence for progress in each. Let's review them:

1. Develop effective medicines. We have a good start in both ARO-AAT and ARO-HBV and are optimistic that they could eventually become powerful medicines.
2. Work within timelines that others cannot. We started developing TRiM-based ARO-HBV and ARO-AAT in the 4th quarter of 2016. If we are accepted at AASLD, we will have gone from concept to the presentation of meaningful clinical data in just 2 years for 2 different programs. We believe that is virtually unheard of, and we have several additional candidates to follow.
3. Have a validated platform that provides a level of de-risking before clinical studies even begin. This is an area that just requires time. But given the safety and activity profiles thus far with ARO-AAT and ARO-HBV, we feel increasingly confident about future hepatocyte-targeted TRiM-based candidates.
4. Have the ability to target many cell types and therefore a wide variety of diseases. In addition to hepatocyte-targeted candidates, we have good

proof of concept in TRiM-based lung targeting and solid tumor targeting now and continue to work toward additional cell types.

5. Be the partner of choice for RNAi therapeutics. Everything we have discussed today, from our development speed to our encouraging early clinical data and ability to target a variety of tissues reinforces our belief that we can be a powerful partner in RNAi. In addition, we believe that our continued progress with the Amgen partnership serves as a good proof-of-concept for this aspect of our business strategy.

We believe Arrowhead is on solid footing today and has much more on the horizon. We think we are just in the early stages of a period where we see substantial opportunities to build value though rapid pipeline growth, key data readouts in the near and mid-term, and by exploring opportunities to expand our reach through business development and partnering.

We look forward to giving a meaningful update on our progress and plans for our emerging pipeline, including ARO-APOC3, ARO-ANG3, our TRiM™ enabled inhaled pulmonary platform, including ARO-ENaC, and our TRiM™ enabled solid tumor platform, including ARO-HIF2 at our R&D day in October.

Thanks again for joining us today. I would now like to open the call to your questions. Operator?

Operator

Operator opens the call to questions …