

BLUEBIRD BIO, INC.

AUDIT COMMITTEE CHARTER

I. General Statement of Purpose

The purposes of the Audit Committee of the Board of Directors (the “**Audit Committee**”) of bluebird bio, Inc. (the “**Company**”) are to:

- oversee the accounting and financial reporting processes of the Company and the audits of the Company’s financial statements;
- take, or recommend that the Board of Directors of the Company (the “**Board**”) take, appropriate action to oversee the qualifications, independence and performance of the Company’s independent auditor;
- prepare the report required by the rules of the Securities and Exchange Commission (the “**SEC**”) to be included in the Company’s annual proxy statement;
- oversee the procedures for addressing complaints and concerns regarding accounting, internal accounting controls or auditing matters; and
- review related person transactions.

II. Composition

The Audit Committee shall consist of at least three (3) members of the Board, each of whom must: (1) be “independent” as defined in Rule 5605(a)(2) under the Stock Market Rules of The NASDAQ Stock Market LLC (“**NASDAQ**”); (2) meet the criteria for independence set forth in Rule 10A-3(b)(1) promulgated under Section 10A(m)(3) of the Securities Exchange Act of 1934, as amended (the “**Exchange Act**”), subject to the exemptions provided in Rule 10A-3(c) under the Exchange Act; and (3) not have participated in the preparation of the financial statements of the Company or a current subsidiary of the Company at any time during the past three years.

Notwithstanding the foregoing, one director who (1) is not “independent” as defined in Rule 5605(a)(2) under the NASDAQ Stock Market Rules; (2) satisfies the criteria for independence set forth in Section 10A(m)(3) of the Exchange Act and the rules thereunder; and (3) is not a current officer or employee or a Family Member of such officer or employee, may be appointed to the Audit Committee, if the Board, under exceptional and limited circumstances, determines that membership on the Audit Committee by the individual is required by the best interests of the Company and its stockholders, and the Company complies with the disclosure requirements set forth in Item 407(d)(2) of Regulation S-K. A member

appointed under this exception may not serve on the Audit Committee for more than two years and may not chair the Audit Committee.

Each member of the Audit Committee must be able to read and understand fundamental financial statements, including a company's balance sheet, income statement, and cash flow statement. At least one member of the Audit Committee shall have past employment experience in finance or accounting, requisite professional certification in accounting, or any other comparable experience or background which results in the individual's financial sophistication, including being or having been a chief executive officer, chief financial officer or other senior officer with financial oversight responsibilities. One or more members of the Audit Committee must qualify as an "audit committee financial expert" under the rules promulgated by the SEC.

The members of the Audit Committee shall be appointed annually by the Board and may be replaced or removed by the Board with or without cause. Resignation or removal of a director from the Board, for whatever reason, shall automatically and without any further action constitute resignation or removal, as applicable, from the Audit Committee. Any vacancy on the Audit Committee, occurring for whatever reason, may be filled only by the Board. The Board shall designate one member of the Audit Committee to be Chairman of the Audit Committee. All indemnification, exculpation, expense reimbursement and advancement provisions and rights available to members of the Audit Committee in their capacities as directors of the Company shall be fully applicable with respect to their service on the Audit Committee or any subcommittee thereof.

III. Compensation

A member of the Audit Committee may not, other than in his or her capacity as a member of the Audit Committee, the Board or any other committee established by the Board, receive directly or indirectly any consulting, advisory or other compensatory fee from the Company. A member of the Audit Committee may receive additional directors' fees to compensate such member for the significant time and effort expended by such member to fulfill his or her duties as an Audit Committee member.

IV. Meetings

The Audit Committee shall meet as often as it determines is appropriate to carry out its responsibilities under this Charter, but not less frequently than quarterly. Meetings shall be in person or by conference telephone or other communications equipment by means of which all persons participating in the meeting can hear each other. A majority of the members of the Audit Committee shall constitute a quorum for purposes of holding a meeting and the Audit Committee may act by a vote of a majority of the members present at such meeting. In lieu of a meeting, the Audit Committee may act by unanimous written consent. The Chairman of the Audit Committee, in consultation with the other committee members, may determine the frequency and length of the committee meetings and may set meeting agendas consistent with this Charter.

V. Responsibilities and Authority

A. Review of Charter

- The Audit Committee shall review and reassess the adequacy of this Charter annually and recommend to the Board any amendments or modifications to the Charter that the Audit Committee deems appropriate.

B. Matters Relating to Selection, Performance and Independence of Independent Auditor

- The Audit Committee shall be directly responsible for the appointment, retention and termination, and for determining the compensation, of the Company's independent auditor engaged for the purpose of preparing or issuing an audit report or performing other audit, review or attest services for the Company.
- The Audit Committee shall be directly responsible for oversight of the work of the independent auditor (including resolution of disagreements between management and the independent auditor regarding financial reporting) engaged for the purpose of preparing or issuing an audit report or performing other audit, review or attest services for the Company.
- The Audit Committee shall instruct the independent auditor that the independent auditor shall report directly to the Audit Committee.
- The Audit Committee shall pre-approve all auditing services and the terms thereof (which may include providing comfort letters in connection with securities underwritings) and non-audit services (other than non-audit services prohibited under Section 10A(g) of the Exchange Act or the applicable rules of the SEC or the Public Company Accounting Oversight Board (the "PCAOB")) to be provided to the Company by the independent auditor; provided, however, the pre-approval requirement is waived with respect to the provision of non-audit services for the Company if the "de minimus" provisions of Section 10A(i)(1)(B) of the Exchange Act are satisfied. This authority to pre-approve non-audit services may be delegated to one or more members of the Audit Committee, who shall present all decisions to pre-approve an activity to the full Audit Committee at its first meeting following such decision.
- The Audit Committee may review and approve the scope and staffing of the independent auditor's annual audit plan(s).
- The Audit Committee shall (1) request that the independent auditor provide

the Audit Committee with the written disclosures and the letter required by PCAOB Rule 3526, (2) require that the independent auditor submit to the Audit Committee at least annually a formal written statement describing all relationships between the independent auditor or any of its affiliates and the Company or persons in financial reporting oversight roles at the Company that might reasonably be thought to bear on the independence of the independent auditor, (3) discuss with the independent auditor the potential effects of any disclosed relationships or services on the objectivity and independence of the independent auditor, (4) require that the independent auditor provide to the Audit Committee written affirmation that the independent auditor is, as of the date of the affirmation, independent in compliance with PCAOB Rule 3520 and (5) based on such disclosures, statement, discussion and affirmation, take or recommend that the Board take appropriate action in response to the independent auditor's report to satisfy itself of the independent auditor's independence. In addition, before approving the initial engagement of any independent auditor, the Audit Committee shall receive, review and discuss with the audit firm all information required by, and otherwise take all actions necessary for compliance with the requirements of, PCAOB Rule 3526. References to rules of the PCAOB shall be deemed to refer to such rules and to any substantially equivalent rules adopted to replace such rules, in each case as subsequently amended, modified or supplemented.

- The Audit Committee may consider whether the provision of the services covered in Items 9(e)(2) and 9(e)(3) of Regulation 14A of the Exchange Act (or any successor provision) is compatible with maintaining the independent auditor's independence.
- The Audit Committee shall evaluate the independent auditor's qualifications, performance and independence, and shall present its conclusions with respect to the independent auditor to the full Board. As part of such evaluation, at least annually, the Audit Committee shall:
 - (i) obtain and review a report or reports from the independent auditor describing (1) the auditor's internal quality-control procedures, (2) any material issues raised by the most recent internal quality-control review or peer review of the auditor or by any inquiry or investigation by government or professional authorities, within the preceding five years, regarding one or more independent audits carried out by the auditor, and any steps taken to address any such issues, and (3) in order to assess the auditor's independence, all relationships between the independent auditor and the Company;
 - (ii) review and evaluate the performance of the independent auditor and the lead partner (and the Audit Committee may review and evaluate the performance of other members of the independent auditor's audit staff); and

- (iii) assure the regular rotation of the audit partners (including, without limitation, the lead and concurring partners) as required under the Exchange Act and Regulation S-X.

In this regard, the Audit Committee shall also (1) seek the opinion of management of the independent auditor's performance and (2) consider whether, in order to assure continuing auditor independence, there should be regular rotation of the audit firm.

- The Audit Committee may establish, or recommend to the Board, policies with respect to the potential hiring of current or former employees of the independent auditor.

C. Audited Financial Statements and Annual Audit

- The Audit Committee shall review the overall audit plan with the independent auditor and the members of management who are responsible for preparing the Company's financial statements, including the Company's Principal Financial Officer ("PFO") and/or principal accounting officer ("PAO" and together with the PFO and such other officer or officers are referred to herein collectively as the "**Senior Accounting Executive**").
- The Audit Committee shall review and discuss with management (including the Company's Senior Accounting Executive) and with the independent auditor the Company's annual audited financial statements, including (a) all critical accounting policies and practices used or to be used by the Company, (b) the Company's disclosures under "Management's Discussion and Analysis of Financial Condition and Results of Operations" prior to the filing of the Company's Annual Report on Form 10-K, and (c) any significant financial reporting issues that have arisen in connection with the preparation of such audited financial statements.
- The Audit Committee shall review:
 - (i) any analyses prepared by management and/or the independent auditor setting forth significant financial reporting issues and judgments made in connection with the preparation of the financial statements, including analyses of the effects of alternative GAAP methods on the financial statements. The Audit Committee may consider the ramifications of the use of such alternative disclosures and treatments on the financial statements, and the treatment preferred by the independent auditor. The Audit Committee may also consider other material written communications between the registered public accounting firm and management, such as any management letter or schedule of unadjusted differences;

- (ii) major issues as to the adequacy of the Company's internal controls and any special audit steps adopted in light of material control deficiencies;
 - (iii) major issues regarding accounting principles and procedures and financial statement presentations, including any significant changes in the Company's selection or application of accounting principles; and
 - (iv) the effects of regulatory and accounting initiatives, as well as off-balance sheet transactions and structures, on the financial statements of the Company; and
 - (v) the certifications made by the Company's principal executive officer ("**PEO**") and PFO.
- The Audit Committee shall review and discuss with the independent auditor (outside of the presence of management) how the independent auditor plans to handle its responsibilities under the Private Securities Litigation Reform Act of 1995, and request assurance from the independent auditor that Section 10A(b) of the Exchange Act has not been implicated.
 - The Audit Committee shall review and discuss with the independent auditor any audit problems or difficulties and management's response thereto. This review shall include (1) any difficulties encountered by the independent auditor in the course of performing its audit work, including any restrictions on the scope of its activities or its access to information and (2) any significant disagreements with management.
 - This review may also include:
 - (i) any accounting adjustments that were noted or proposed by the independent auditor but were "passed" (as immaterial or otherwise);
 - (ii) any communications between the audit team and the audit firm's national office regarding auditing or accounting issues presented by the engagement; and
 - (iii) any management or internal control letter issued, or proposed to be issued, by the independent auditor.
 - The Audit Committee shall discuss with the independent auditor those matters brought to the attention of the Audit Committee by the independent auditor pursuant to Statement on Auditing Standards No. 61, as amended ("**SAS 61**").
 - The Audit Committee shall also review and discuss with the independent auditor the report required to be delivered by such auditor pursuant to Section

10A(k) of the Exchange Act.

- If brought to the attention of the Audit Committee, the Audit Committee shall discuss with the PEO and PFO of the Company (1) all significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the Company's ability to record, process, summarize and report financial information required to be disclosed by the Company in the reports that it files or submits under the Exchange Act, within the time periods specified in the SEC's rules and forms, and (2) any fraud involving management or other employees who have a significant role in the Company's internal control over financial reporting.
- Based on the Audit Committee's review and discussions (1) with management of the audited financial statements, (2) with the independent auditor of the matters required to be discussed by SAS 61, and (3) with the independent auditor concerning the independent auditor's independence, the Audit Committee shall make a recommendation to the Board as to whether the Company's audited financial statements should be included in the Company's Annual Report on Form 10-K for the last fiscal year.
- The Audit Committee shall prepare the Audit Committee report required by Item 407(d) of Regulation S-K of the Exchange Act (or any successor provision) to be included in the Company's annual proxy statement.

D. Unaudited Quarterly Financial Statements

- The Audit Committee shall discuss with management and the independent auditor, prior to the filing of the Company's Quarterly Reports on Form 10-Q, (1) the Company's quarterly financial statements and the Company's related disclosures under "Management's Discussion and Analysis of Financial Condition and Results of Operations," (2) such issues as may be brought to the Audit Committee's attention by the independent auditor pursuant to Statement on Auditing Standards No. 100, and (3) any significant financial reporting issues that have arisen in connection with the preparation of such financial statements.

E. Earnings Press Releases

- Prior to public release, the Audit Committee shall discuss the Company's earnings press releases, as well as financial information and earnings guidance provided to analysts and rating agencies, including, in general, the types of information to be disclosed and the types of presentations to be made (paying particular attention to the use of "pro forma" or "adjusted" non-GAAP information).

F. Risk Assessment and Management

- The Audit Committee shall discuss the guidelines and policies that govern the process by which the Company's exposure to risk is assessed and managed by management.
- In connection with the Audit Committee's discussion of the Company's risk assessment and management guidelines, the Audit Committee may discuss or consider the Company's major financial risk exposures and the steps that the Company's management has taken to monitor and control such exposures.

G. Directors & Officers Insurance Policy

- Review periodically the terms and conditions of the Company's directors and officers insurance policy and indemnification arrangements and make recommendations to the Board with respect to changes thereto.

H. Procedures for Addressing Complaints and Concerns

- The Audit Committee shall establish procedures for (1) the receipt, retention and treatment of complaints received by the Company regarding accounting, internal accounting controls, or auditing matters and (2) the confidential, anonymous submission by employees of the Company of concerns regarding questionable accounting or auditing matters.
- The Audit Committee may review and reassess the adequacy of these procedures periodically and adopt any changes to such procedures that the Audit Committee deems necessary or appropriate.

I. Regular Reports to the Board

- The Audit Committee shall regularly report to and review with the Board any issues that arise with respect to the quality or integrity of the Company's financial statements, the Company's compliance with legal or regulatory requirements, the performance and independence of the independent auditor and any other matters that the Audit Committee deems appropriate or is requested to review for the benefit of the Board.

VI. Additional Authority

The Audit Committee is authorized, on behalf of the Board, to do any of the following as it deems necessary or appropriate:

A. Engagement of Advisors

- The Audit Committee may engage independent counsel and such other advisors it deems necessary or advisable to carry out its responsibilities and powers, and, if such counsel or other advisors are engaged, shall determine the compensation or fees payable to such counsel or other advisors and shall inform the Company's PFO of such engagement.

B. Legal and Regulatory Compliance

- The Audit Committee may discuss with management and the independent auditor, and review with the Board, the legal and regulatory requirements applicable to the Company and its subsidiaries and the Company's compliance with such requirements. After these discussions, the Audit Committee may, if it determines it to be appropriate, make recommendations to the Board with respect to the Company's policies and procedures regarding compliance with applicable laws and regulations.
- The Audit Committee may discuss with management legal matters (including pending or threatened litigation) that may have a material effect on the Company's financial statements or its compliance policies and procedures.

C. Conflicts of Interest

- The Audit Committee shall conduct an appropriate review of all related party transactions for potential conflict of interest situations on an ongoing basis, and the approval of the Audit Committee shall be required for all such transactions, in accordance with the Company's Related Person Transaction Approval Policy.
- The Audit Committee shall designate an individual to serve as the Compliance Officer under the Related Person Transaction Approval Policy and shall have the authority to remove and replace the Compliance Officer at any time.
- Review and reassess the adequacy of the Related Person Transaction Approval Policy annually and recommend any proposed changes to the Board for approval.

D. Insider Trading Policy

- The Insider Trading Compliance Officer shall consider and have sole authority to grant any requested waiver from the Company's Special Trading Procedures for Insiders.
- The Audit Committee shall consider and have sole authority to approve any request from a director, executive officer or other individual covered by the Company's Special Trading Procedures for Insiders to (i) buy or sell puts, calls, other derivative securities of the Company or any derivative securities that provide the economic equivalent of ownership of any of the Company's securities or an opportunity, direct or indirect, to profit from any change in the value of the Company's securities; or (ii) pledge Company securities as collateral for a loan (or modify an existing pledge).

E. General

- The Audit Committee may form and delegate authority to subcommittees consisting of one or more of its members as the Audit Committee deems appropriate to carry out its responsibilities and exercise its powers.
- The Audit Committee may perform such other oversight functions outside of its stated purpose as may be requested by the Board from time to time.
- In performing its oversight function, the Audit Committee shall be entitled to rely upon advice and information that it receives in its discussions and communications with management, the independent auditor and such experts, advisors and professionals as may be consulted with by the Audit Committee.
- The Audit Committee is authorized to request that any officer or employee of the Company, the Company's outside legal counsel, the Company's independent auditor or any other professional retained by the Company to render advice to the Company attend a meeting of the Audit Committee or meet with any members of or advisors to the Audit Committee.
- The Audit Committee is authorized to incur such ordinary administrative expenses as are necessary or appropriate in carrying out its duties.

Notwithstanding the responsibilities and powers of the Audit Committee set forth in this Charter, the Audit Committee does not have the responsibility of planning or conducting audits of the Company's financial statements or determining whether the Company's financial statements are complete, accurate and in accordance with GAAP. Such responsibilities are the duty of management and, to the extent of the independent auditor's audit responsibilities, the independent auditor. In addition, it is not the duty of the Audit Committee to conduct investigations or to ensure compliance with laws and regulations or the Company's Code of Business Conduct and Ethics.

Adopted May 5, 2013, subject to effectiveness of the Company's Registration Statement on Form S-1.